Incorporating "The Illuminating Engineer."

Light and Lighting

Official Journal of the Illuminating Engineering Society.

32, Victoria St., London, S.W.1.

Edited by J. STEWART DOW

Telephone: ABBey 5215

Vol. XXXI.—No. 10 **October, 1938** PRICE NINEPENCE
Subscription 10/6 per annum, post free

Principal Contents:

	PAGE
Editorial Notes	229
Notes and News	230
Air Raid Precautions and Lighting	231
Gas Lighting for Small Towns....	232
Lighting a County Borough	234
Radiation from Artificial Illuminants....	236
A.P.L.E. Exhibition	238
Public Lighting at the World Power Conference	242
Lighting Literature	244
Recent Patents....	246
Illuminating Engineering Abroad	251
Trade Notes	252
Where to Buy	254

The Flight of The Shadow

IN a famous passage to a hushed House of Commons John Bright once declared "*The Angel of Death is abroad in the Land; we can almost hear the beating of his wings.*"

To many, during the fateful days at the end of last month, there must have come a similar feeling. To the writer there came, oddly enough, a recollection of that day eleven years ago when he stood on a bleak Yorkshire hill in the chill morning to witness the total eclipse of the sun—the sudden swoop when all the light of the world seemed to go out, and then miraculously returned.

Even so the world has trembled on the brink of the Abyss of War, and then, incredibly and almost miraculously, has escaped the plunge.

The crisis almost synchronised with the issue of the I.E.S. programme for the Session. Fortunately there was no cancellation of events. The season duly commenced with the Opening Meeting on October 11th.

And now, let us get on with our work.

I.E.S. Session Opens

The opening meeting of the Illuminating Engineering Society on October 11 coincided too closely with our date for going to press for any detailed account to appear in this issue. The exhibits will be described next month. In spite of the crisis exhibits (and audience!) were as numerous as ever and members and friends had a most interesting evening. The opening item on the programme handled by Mr. Lingard, the new arrangements at the E.L.M.A. Lighting service Bureau, in itself, made a visit well worth while, and it was a happy thought for members and friends to be invited to remain for an informal gathering afterwards. The programme of the Society —issued rather earlier than usual in spite of the crisis—is a very full one, with over thirty general meetings, sectional meetings, and visits for London alone. The various local centres, now five in number, have also excellent series of meetings. The North Midland Local Centre, we see, has arranged an annual dinner-dance for November 18. We hope that some London members will apply for tickets (price 10s. 6d. each) for this event.

Courses in Illuminating Engineering

In our last issue we referred to the courses in illuminating engineering, specially designed to cover the syllabus of the City and Guilds examinations, at the Northampton Polytechnic and the South-East London Technical Institute. We note with interest that a similar course has just commenced at the Borough Polytechnic (London, S.E.1), the lecturer being Mr. R. R. Holmes. It is also encouraging to learn that the movement is not confined to London. Courses on illumination are being initiated under the auspices of the Yorkshire Council for Further Education at the University of Sheffield, during the autumn, and at the Leeds College of Technology in the spring. If successful the courses will be extended to other centres. We have received from Mr. J. W. Howell the syllabus of the courses, in the organisation of which he has taken a leading part. The general lines are not unlike those followed in the course in London. Both fundamentals and applications of light are covered, and each of the eleven lectures will be delivered by a specialist.

New Telephone Number

Will all readers of this journal, and I.E.S. members in particular, please note that the correct **Telephone Number,** *both for* LIGHT AND LIGHTING *and for the Illuminating Engineering Society is* **ABBey 5215** *(no longer "Victoria.") Thank You.*

Outdoor Photometry

We are asked to remind members of the discussion on the above subject at the forthcoming meeting of the Photometry Section of the Illuminating Engineering Society, on November 29. Those willing to contribute their views and experiences are asked to send in their names to the honorary secretary of the Section (Mr. K. F. Sawyer, Watson House, Townmead-road, Fulham, London, S.W.6), mentioning the particular problems with which they propose to deal, so that some preliminary reference thereto may be made in the introductory address.

I.E.S. Meetings

LONDON.

Oct. 11th. Opening Night (Exhibits); *E.L.M.A Lighting Service Bureau, 2, Savoy Hill, W.C.2.*

Oct. 17th. Lighting Faults (W. ROBINSON); *Junior Institution of Engineers, 39, Victoria Street, S.W.1.*

Oct. 21st. Siting Street Lamps; *E.L.M.A. Lighting Service Bureau, 2, Savoy Hill, W.C.2.*

Oct. 25th. Trend of Decorative Lighting (A. B. READ); *The Besant Hall, Rodmarton Mews, Gloucester Place (nr. Baker St. Station).*

Oct. 27th. Lighting Practice in U.S.A. (H. A. LINGARD); *E.L.M.A. Lighting Service Bureau, 2, Savoy Hill, W.C.2.*

Nov. 8th. Visibility of Street Lighting (C. DUNBAR, F. C. SMITH AND J. M. WALDRAM); *Institution of Mech. Engrs., Storey's Gate, Westminster, S.W.1.*

Nov. 14th. Elec. Discharge Lamps in Industry (C. A. HUGHES); *Home Office Industrial Museum, Horseferry Road, S.W.1.*

Nov. 16th. Combined Tungsten and Elec. Discharge Lighting (W. R STEVENS); *E.L.M.A. Lighting Service Bureau, 2 Savoy Hill, W.C.2.*

MANCHESTER.

Nov. 16th. Visibility of Street Lighting; *Engineers' Club, Albert Square* (7.15 p.m.).

LEEDS.

Oct. 10th. Factory Lighting add Accident Prevention (E. W. MURRAY), *Electricity Showrooms, The Headrow.*

Nov. 18th. Annual Dinner Dance, *Powolnys, Bond Street.*

BIRMINGHAM.

Oct. 21st. Opening Meeting (Exhibits), *White Horse Hotel, Congreve Street.*

Nov. 25th. Glass Manufacture (W. M. HAMPTON); *White Horse Hotel, Congreve Street.*

GLASGOW.

Oct. 19th. Lighting of the Empire Exhibition (R. O. ACKERLEY), *"The Gordons," 19, Gordon Street.*

Nov. 15th. Exhibition of Lighting Equipment; *Room 149, Royal Technical College.*

DUBLIN.

Oct. 18th. Physics of Light (W. H. POOLE); *Engineers' Hall, 35, Dawson Street.*

Nov. 15th. Photometry (H. B. RUFF); *Engineers' Hall, 35, Dawson Street.*

N.B. *Unless otherwise announced all meetings commence at 7 p.m.*

Further Notes on the A.P.L.E. Conference

(Bournemouth, September 5th—8th, 1938)

In our last issue (pp. 205-208, Sept., 1938) we gave a preliminary account of the proceedings at the Conference of the Association of Public Lighting Engineers held in Bournemouth during September 5th—8th. In what follows we summarise the remaining papers and include some further notes on the Exhibits.

Air Raid Precautions and Lighting

In dealing with this topic Mr. Thomas Wilkie pointed out the special position of lighting in connection with air raid precautions. Lighting may definitely be a cause of danger from the air; yet, even when absent, that danger is not automatically removed. The object of the paper was to set out reasons why a state of continuous darkness could not be regarded with equanimity. Since the Great War, the author suggested, there had been notable advances, and a number of control systems had been devised. It should be possible to entrust the control of lighting to one or more of these systems, which might also be of great value in giving warnings, calling air wardens, etc. He believed that the provision of lighting during non-raid periods would contribute materially to reducing the rigours of war and that it was possible to obtain the necessary degree of accuracy of control gear.

Mr. Wilkie then proceeded to describe the experiments conducted in Leicester in order to test methods of aiding essential traffic in darkened streets. At the date of the experiment (January 28) there was no moon, and initially a slight haze, presently turning to rain. Arrangements were made for the extinction of lamps by 12.30 a.m.—a process involving the turning out of many lamps by hand. The time taken to darken Leicester on this occasion was between one and a quarter and one and a half hours (which, of course, would be inadmissible from the A.R.P. standpoint). Mr. Wilkie explained the instructions to lamplighters and the adjustment of controllers and time-switches. By means of the system of control, most of the lamps in main roads were extinguished from the head office in eighty-six seconds, but, owing to a defect on one small section, the time was ten minutes.

In the next section of the paper Mr.Wilkie described in detail the treatment of "keep left" bollards, one-way signs, traffic signals, etc., so as to render them inconspicuous from above. It was necessary to keep alight certain equipment on roads under test, and preliminary experiments were made to determine the intensity that could be safely used. For light-traffic signals ordinary intensities were retained, but each lens was covered by metal discs or black paper in such a way as to reduce greatly the area exposed to traffic. Metal louvres were fitted to guardposts so as to screen light from upward view. Traffic signals and motor-car headlights were likewise fitted with special hoods. Masks were fitted to reduce the intensity, and headlights were dipped. It was a surprise to discover that it was possible to drive by such very low intensities in these darkened conditions.

The test-streets were divided into eighteen sections, each section being treated in a different manner as regards aids to driving, in accordance with the wishes of the Home Office. Descriptions were given of these methods which included the use of reflectors at various distances, from 25 ft. to 45 ft., and the treatment of kerbs and other objects, either wholly or partially, with white paint. The commencement of each section was indicated by specially made lanterns using white alphabetical letters on a black field.

A collection of opinions from drivers elicited definite views as to which were respectively the best and the worst areas. The existence of a white centre line was a determining factor in the choice of Section 1 as one of the best. The use of reflectors did not receive much support, but the author believes that they could be of value if properly located, e.g., if care were taken to ensure that they were struck by the light from headlights, and if a proper relation were established between the width of the road and the angle of the reflector face.

The time taken to traverse the 6.7 miles was 35.5 minutes—a very good time, especially in view of the complete absence of accidents, which could hardly be expected if similar darkened conditions were enforced over a protracted period.

The experiment might be criticised on the grounds that every driver was familiar with the route and knew the road-markings beforehand, and was accompanied by an observer who assisted in navigation, and that no pedestrians were using the roads during tests. The test was of value as an experiment, but more thought should be given to the subject.

Mr. Wilkie quoted from the Home Office Circular of February 14, 1938, to the effect that normal street lighting would not be permitted in time of war, that adequate devices to aid movements in darkened streets would be necessary, and that relaxation could not go beyond permitting a certain amount of modified and carefully screened street lighting during periods between raids. Personally, the author did not believe that continuous darkness was necessary. He thought it was not impossible to devise an acceptable system of control of street lighting, and that in view of this lighting might be continued during normal dark hours and only extinguished when the air raid signal was given. Circumstances to be considered in this connection were the great precision of modern night flying, the purpose of air raids, which made it essential to disguise works of national importance, if possible, but not to treat similarly towns and cities containing nothing of value to the enemy.

On the other hand lighting of some sort would prove essential after a raid, as an assistance to fire brigades and ambulances, and the control of crime might prove difficult during prolonged periods of darkness.

In conclusion, the author remarked on changes in social habits that have occurred since the Great War, such that measures applied then might not answer equally well to-day. The vital point, however, was to evolve a system of control which would be sufficiently efficient to satisfy those in authority.

A keen discussion ensued in which Mr. J. F. Colquhoun, Mr. F. C. Smith, Mr. F. P. Crook, Councillor H. A. Benwell, and others took part. The difficulties involved in intermittent lighting were summarised by Mr. Colquhoun and Mr. Smith, the latter of whom deprecated the impression that the Home Office had not taken all the relevant factors into consideration. He also stated that a number of firms had been working for years on the problem of distant control, both for gas and electric lighting.

Public Lighting by Gas in Small Towns

Mr. W. Hodgkinson, the author of a paper on this subject, described some of the installations erected during the past three years within the area of the United Kingdom Gas Corporation, which controls a total of sixty-six gas undertakings.

In the first section of the paper, dealing with Main Traffic Road Lighting, a number of installations with somewhat similar characteristics were illustrated. In general in these cases the mounting height was of the order of 23½ ft. to 25 ft., the spacing 130 ft. to 150 ft., the width of road 30 ft. to 35 ft., and the overhang from kerb 3 ft. The first installation described, at Denton (Lancs), utilised 12-light No. 2 "London" lamps furnished by William Sugg and Co., Ltd., and provided with automatic ignition. A demonstration instalment of twenty-five lamps was put up in 1925, and as a result a ten-year contract was arranged. The iso-foot-candle diagram showed minima of 0.16 ft.-c. at the sides of the road and 0.18 ft.-c. in the middle.

At Ormskirk (Lancs) three miles of main traffic routes are illuminated with 12-light and 8-light "Maxhill" lamps furnished by W. Parkinson and Co. Two independently operated clusters of burners are fitted with adjustable reflectors. The lamps are mounted on Adastra poles and fitted with automatic ignition. The iso-foot-candle diagram for this installation shows a minimum of 0.15 ft.-c., but a considerable portion of the route receives between 0.2 ft.-c. and 0.5 ft.-c.

Yet another installation is that at Morley (Yorks), where 10-light No. 2 size "Alpha" lamps (Foster and Pullen) equipped with "Wask" raising and lowering gear have been used.

Mr. Hodgkinson drew attention to the increasing use of gas as a source of illumination for road signs and guard posts. One objection raised in connection with the latter is the danger of escape of gas in the event of the post being knocked down by a vehicle. This has now been completely overcome by an ingenious form of automatic valve, now being made by Messrs. William Sugg and Co., Ltd.

The author draws attention to the rather curious fact that little of the literature dealing with public lighting relates to side roads, notwithstanding the fact that probably 75 per cent. of the lighting in the country is for this purpose. Such lighting is specially valuable as a deterrent to crime. A case is quoted in which an average of six cases per annum had been experienced before the introduction of better lighting, after which the trouble ceased.

As examples of side road lighting installations of Rochester (Sugg), Arcturus (Foster and Pullen), and Stechford (W. Parkinson and Co.) lamps were described, the staggered spacing in these instances being 120 ft., the width of road 22 ft. to 24 ft., and the height of suspension 13½ ft. to 15 ft. Minimum values of illumination of the order of 0.04 ft-c. to 0.06 ft.-c. were shown. The author did not support the belief that the square type of lantern is out of date, and quotes experience with a new road at Rothwell (Yorks), where excellent lighting was achieved with lanterns of this type, to which Holophane rings were applied. He also emphasised the possibilities in improving rather than scrapping existing installations. The savings effected in labour charges and gas consumption by the use of automatic control and modern high-efficiency burners might cover the cost of increased light output and provide a contribution to the interest charges on the capital expenditure involved.

A view of Queensway, Paddington, where a twin five-light burner Maxhill lamp has been installed. Each lamp is fitted with a pair of reflectors, independently adjustable in vertical and azimuthal directions

Turning next to the effect of the M.O.T. final report, the author stated that on four recent occasions he had prepared lighting schemes to conform to the report—only to find that they were far beyond the spending power of the authorities. In the case of a small urban district council in Yorkshire, having sixteen miles of main traffic road, a Group A standard would involve an additional rate of 1s. 3d., 7d. of which would be required to meet the cost of the standard 25 ft. high. In another case a rate of 1s. 2d. would have been needed; the ratepayers at a public meeting voted for lighting to a maximum rate of 3d. Authorities were anxious to improve their lighting but some assistance was essential in many cases.

Mr. Hodgkinson stressed the importance of efficient maintenance. Authorities not themselves in a position to ensure this should seek the aid of larger adjoining authorities having a public lighting engineer. Modern developments enabled undertakings to offer very favourable guarantees, and installations could be maintained to within 20 per cent of their initial values.

In the concluding section of the paper the author alluded to the development of automatic ignition and the advantages of the Horstmann "Comet" type igniter, to the automatic control of gas lighting by the aid of the photo-electric cells, as recently adopted in certain schools, and to the central control and extinction of gas supplies in case of emergency. Appliances, based on the use of a simple cut-off valve, operated either by an increase or decrease in pressure, are available. Once the valve has been operated it will remain closed until opened manually.

In the ensuing discussion Mr. Ronald Parker commended the suggestion that lighting authorities should combine to obtain expert advice, and urged that gas undertakings should adopt a more generous standard in lighting main roads. Mr. F. Sawyer recalled the initiation, quite a number of years ago, of methods of central control for gas lighting. Siting was more important than the mere provision of lumens. Mr. Winston suggested that with 3,500 lumens per 100 ft. one could see a quarter of a mile ahead with ease, and that higher values were unnecessary. Dealing with costs he mentioned an area where a 1d. rate brought in only £30 a year and there were five miles of road to administer. Some discussion took place on the figure of 0.25 cub. ft. per hour for by-passes and on the desirability of framing long term contracts so that advantage could be taken of lighting developments.

New

SUGG
WESTMINSTER

● THE METRO LIGHT ACTUATED CONTROLLER

Designed for the automatic simultaneous control of groups of Gas Lamps on roundabouts and Traffic Islands. Operates whenever daylight illumination falls to a dangerously low value.

● GUARD POST SAFETY CUT-OFF VALVE

Automatically cuts off the gas supply in case of accidental destruction of a guard post. This is an essential safety device for all guard posts and can also be applied to lamp columns.

● SUGG-HORSTMANN COMET REMOTE CONTROL SYSTEM

This very important development enables groups of lamps to be operated on distant control without by-pass consumption.

● NEW PATTERN FACTORY LAMP

Provides the simplest method of modernising factory lighting to comply with the Home Office recommendations. This Lamp is specially designed for high efficiency and very easy maintenance.

SUGG
WESTMINSTER

The Development of Street Lighting in a County Borough

The paper under this title by Mr. J. K. Brydges and Mr. N. Boydell summarised the early history of public lighting in Eastbourne in which early gas lamps, electric arc lamps, and electric filament gas-filled lamps all played their part. In 1918 it was decided to convert gradually to electric lighting, 60-watt lamps, presently replaced by 100 and 200-watt lamps, being used. By 1932 the development of the street lighting was placed in the hands of the Borough Electrical Engineer. A further feature was the introduction of automatic control, selenium bridges being inconspicuously mounted in brackets, in contrast to the rather clumsy methods causing these devices to appear as excrescences, often used. Light-sensitive apparatus is used to a great extent for bollards and direction signs, for which dusk to dawn control is specially appropriate. The authors also give particulars of time switches used in Eastbourne, the overcoming of early difficulties in design, and the treatment of the area still controlled by hand-switching. Later an improved form of control employing relays operated by a high frequency impulse superimposed on the existing system of distribution was adopted.

Side Street Fittings.

For side street fittings housing 100-watt or 200-watt lamps with non-axial asymmetric refractors were adopted. No outer globes are used in view of the saving of loss by absorption and the reduction of cleaning time.

Beams are located at 12½ deg. from the axis and are wide enough to cover the roadway. With such fittings mounted 15 ft. high and 120 ft. apart 0.82 foot-candles (reduced to 0.66 foot-candles after 1,000 hours burning) is provided under the lamp and 0.17 foot-candles at B.S.S. test point—almost up to Class G. B.S.S. standard. The majority of roads falling in Group "B" are thus lighted. At important junctions there are also 250-watt mercury discharge lamps with three 100-watt filament lamps assembled within a lantern mounted 25 ft. high.

Life of Lamps.

The next section of the paper was devoted to annual contracts, accidents, and insurance, and lamp renewals. The average life of lamps has proved to be 3,000 hours for sodium, 2,000 for mercury, and 1.200 for filament lamps. No very conclusive evidence of a relation between lamp renewals and weather conditions has been found, though high renewals occasionally follow a high wind and sometimes occur during a period of humidity. General renewals also appear to be high when there is a continuous period of rain. Each lamp is cleaned, on the average, every three weeks. Under the head of administration and finance one notes that the chief items are supply (£7,530), wages of lamp-lighters, etc (£2.250), repairs and maintenance (£2,400), improvements in lighting main roads (£4,310), and loan charges (Parade lighting, etc., £717).

Adoption of Discharge Lamps.

Turning to present developments the authors summarise the considerations leading to the installation of discharge lamps and the final decision to adopt sodium lamps for main approach roads and blended (mercury discharge and filament lamps combined) lighting for shopping streets. The selection of sodium lamps was guided by the facts that the effciency (60 lumens per watt) is very high and the intrinsic brightness relatively low. The monochromatic nature of the light eliminates chromatic aberration and is favourable to visual acuity and the contrast of objects on the road is very marked. Moreover, sodium lamps are least affected by voltage rise and fall. Experience with concrete roads has shown the advantage of this light surface, but as such surfaces are not considered very permanent they are apt to be covered with bituminous material. A dressing of stone chippings bound by bituminous material is at present considered best from the standpoint of economy, absence of skidding, and durability. An opportunity was recently afforded of observing the effect of a surface temporarily made up with chalk. The silhouetting of objects on this very white background was very striking.

Light Output and Foot-Candles.

In view of the low brightness of the sodium lamp a close cut-off was not considered necessary, and a fitting based on the use of silvered glass mirror-reflectors around the horizontal light-source was selected. The two asymmetric beams are very wide and illuminate the area adjacent to the thoroughfare itself, thus avoiding the "tunnel-effect" disliked by motorists. The output of the lanterns is 6,600 lumens, or 4,400 per 100 ft. at 150 ft. staggered spacing, thus conforming to the M.O.T. recommendations for Group A roads. The B.S.S. test-point illumination is 0.14 foot-candles (equivalent to Class E). Where 120 ft. spacing is adopted, giving 5,500 lumens per 100 ft., the test-point illumination is 0.31 foot-candles (Class D). After 2,800 hours the initial output in lumens of 9,600 has fallen to 6,900, and the foot-candles under the fitting from 1.3 to 0.97.

The lighting, however, shows no material deterioration.

The fittings adopted for shopping streets embody one 400 mercury discharge lamp with three 100-watt filament lamps, giving an overall efficiency of 30.9 lumens per watt, and in the secondary thoroughfares one 250 watt mercury lamp with three 100 watt filament lamps in each fitting, giving an overall efficiency of 24.1 lumens per watt.

The results of a questionnaire addressed to motor omnibus drivers show that 76.8 per cent. preferred amber and 18.7 bluish-white light. Somewhat similar views were expressed by members of the Borough Police Force; only a very small number preferring ordinary light. In the case of residents (approached verbally) 100 per cent. considered the discharge lighting a considerable improvement on filament lighting, and 56 per cent. preferred the blended mercury to the sodium lighting; the objection to the sodium was not the distortion of colours of object illuminated, but of the actual amber colour itself. Steel columns of modern slender design were adopted both for shopping streets and main roads.

Costs Per Mile.

The initial cost per column of sodium discharge installations averages £25 10s., which, with 150 ft. staggered spacing, averages £897 per mile. The running cost on all night-lighting amounts to £6 6s. per column and to £223 per mile. As lighting in Eastbourne is reduced by half at midnight on main roads, the running cost per mile becomes £162 per annum. The initial cost per column of the blended mercury discharge lighting averages £28 per column; at 150 ft. staggered spacing £985 per mile, and at 120 ft. staggered spacing £1,231 per mile. The running cost per column per annum of maintaining one 400 watt mercury and three 100 watt filament lamps on all night lighting amounts to £18 8s., but as filament lamps are extinguished at midnight the actual cost is £14 13s. per column per annum. The initial cost of the Group B road installations is £8 16s. complete, and the running cost, assuming all-night lighting, £2 5s. 8d. per column.

High Frequency Control.

An important recent development is the installation of a centralised control of street lighting by means of superimposed high frequency operating

relays, fitted in the column bases. The details of this arrangement are described in the paper. It is interesting to note that the actual illumination of unrestricted daylight at the time of the dusk signal averages 4 foot-candles, and in a selected narrow street a value of 2 foot-candles was recorded. A somewhat similar scheme is operated in Berlin.

In the concluding part of the paper it is pointed out that the practice in regard to lighting with electric discharge lamps resembles that adopted in Holland and Germany. An advantage of the blended lighting is its flexibility. An attempt to produce a daylight effect which would involve twice the wattage of the mercury lamps being allotted to filament lamps, was not considered expedient. The combined composite lighting units were preferred to the luminescent mercury discharge lamps. It is suggested that the use of lamps furnishing ultra-violet energy, in conjunction with fluorescent materials, may prove useful for street refuges during air-raid periods.

Tests of Visibility

The authors refer to the difficult problem of estimating visibility in lighted streets owing to the many different aspects involved. Mention is made of tests made with the recently introduced " visibility meter " involving the observation of the roadway through a glass disc with spots of graded transmission. Experiments were also made with silhouette figures of a man photographed in varying degrees of grey and black on a strip of film attached to the wind-screen of a car. The appearance of such silhouettes was studied in the same way as the spots in the visibility meter. It is suggested, however, that such methods are primarily useful in making comparisons of road brightness, and that a satisfactory means of testing visibility remains to be evolved.

Conclusion

During the period covered by the paper, the total candle-power in Eastbourne has increased from 10,000 to about 540,000 at a total of 2,680 lighting points. Apart from the requirements of traffic there are other reasons for good lighting, which has an influence on the attraction of visitors and which stimulates business, particularly in shopping areas. Appearance in daylight is an important consideration. One argument against central suspension is the unsightly appearance of the wires spanning the roadway. Statistics in Eastbourne show that 38 per cent. of accidents occur in side roads, which indicates the importance of adequate lighting for roads of the Class B category.

Discussion

In the discussion there were some remarks on visibility, especially in connection with the effect of the glare from the sources adopted. There was also some comment on the correctness or otherwise of the photographs of lighting installations shown by the authors. It was urged by Mr. Maxted that glare was largely a matter of the candle-power emitted, and that distribution of light from a lantern was more important than the colour. This consideration often affects the results of tests designed to compare illuminants having different colour values. Some argument also ensued on the value of the opinions derived from the questionnaire mentioned in the paper. The authors, however, contended that these were honest opinions obtained from representative members of the public, and therefore entitled to consideration. The authors were congratulated by Mr. Horsfall and others on the adoption of a systematic plan in the lighting of Eastbourne, though the desirability of " grading " was regarded as questionable, being apparently discouraged in the M.O.T. Report.

"TRUNK ROAD LIGHTING MADE EASY"—

by

WASK
PATENT
GEAR

FOR ALL TYPES OF
GAS OR ELECTRIC
OVERHEAD LAMPS

CLEANING SAFELY DONE
ON THE KERB
WITH THE SUPPLY
ALWAYS CONNECTED

PATENTEES & MAKERS:
WALTER SLINGSBY & CO., LTD.
VALLEY WORKS KEIGHLEY

The ELECTRICAL REVIEW
FOUNDED 1872

The Complete Technical Journal

Gives practical information and authentic technical commercial news necessary to those who are concerned with the Production, Installation and Maintenance of electrical equipment, Generation and Distribution. Its advertisement pages constitute the most complete Buyer's Guide to all electrical products.

All those interested in illumination matters will find this journal of particular value in its description of fittings and material used in up-to-date installations, giving detailed descriptions of the equipment of important new buildings.

Certified Net Sales over 10,000 copies per week.

EVERY FRIDAY 6d.

Subscription:
United Kingdom £1 14 8 Canada £1 12 6
Other Countries £2 1 6 per annum, post free

ELECTRICAL REVIEW LTD.
Dorset House, Stamford Street, London, S.E.1.

Radiation from Artificial Illuminants

The production of light invclves processes in which energy, previously converted existing in some other form, is converted into radiation.

There is, however, a big discrepancy between the range of frequencies which excite the retina of the eye and the total frequency range of the radiation emitted, even by the most efficient known sources. Mr. J. N. Aldington, in his paper under the above title, illustrated this fact by numerous diagrams and tables. He pointed out the results of the fact that there is no appreciable visual effect, however much power is radiated, below about 4,000 A. (beyond the extreme violet) or above about 7,000 Å (deep red).

Quality of Radiation and Efficiency.

The retina is excited most effectively by radiation of about 5,500 Å. In the case of a source such that the entire output of power was confined to this central yellow-green region, the efficiency would reach the remarkable figure of 621 lumens per watt. It is obvious that the efficiency of existing sources, which emit radiation variously distributed in other regions of the visible spectrum must be diminished accordingly, and still more so by the existence of invisible radiation outside these limits. It is interesting to note that if the eye could appreciate a waveband extending from 2,000 Å. to 40,000 Å. instead of the narrower range mentioned above, the efficiencies of modern illuminants might be increased to as much as ten times their present values.

Influence of Temperatures on Incandescence.

In the next section of the paper Mr. Aldington dealt with the effect of temperature on the performance of incandescent solids, illustrated by the consideration of what happens when a wire is heated in a dark room. At 500° C. a curious nondescript greyish colour is the first evidence of light, after which it passes through the stages of dull red (700° C.), cherry red (900° C.), orange (1,100° C.), white (1,300° C.), and dazzling white (1,500° C.).

The author presented a diagram showing the distribution of energy in the spectrum of a non-selective radiator at 2,000° K. and illustrating the minute proportion of such radiation occurring within the visible range. At higher temperatures the proportion of visible radiation increases, and the maximum of the curve moves progressively towards the shorter wavelengths. At a temperature of about 6,500° C. the power radiation between 4,000 Å. and 7,000 Å. would be a maximum, and an efficiency of the order of eighty lumens per watt is theoretically possible. At still higher temperatures the efficiency would progressively diminish.

Selective Radiation.

The problem is more complicated in the case of materials which exercise selective radiation of which the incandescent mantle, consisting essentially of thoria with 1 per cent. of ceria, is an outstanding example. It has been shown that such a mantle attains a temperature several hundreds of degrees higher than that of a thin metallic wire when placed in the same flame, and in the near infra-red it has an emissivity much less than that of a black body at the same temperature.

Increasing Filament-Temperatures.

With the exception of carbon tungsten has the highest melting point of all known elements. The author briefly summarised the successive steps (such as the use of an inert gas to surround the filament and the adoption of " coiled coil " filaments) which have contributed to higher efficiency, and he presented a striking diagram showing the effect of the size of the lamp on its initial efficiency. With an input of power approaching 1,500 watts 20 lumens per watt can be attained, whereas with a 100-watt lamp only about 12 lumens per watt is available, and at smaller wattages the efficiency becomes even less. The objective of lamp companies has been to devise conditions rendering possible continually higher filament-temperatures with corresponding gains in efficiency. It is worthy of note, however, that the theoretical limit is 50 lumens per watt, attainable with a tungsten filament operating at its melting point.

Electric Discharge Lamps.

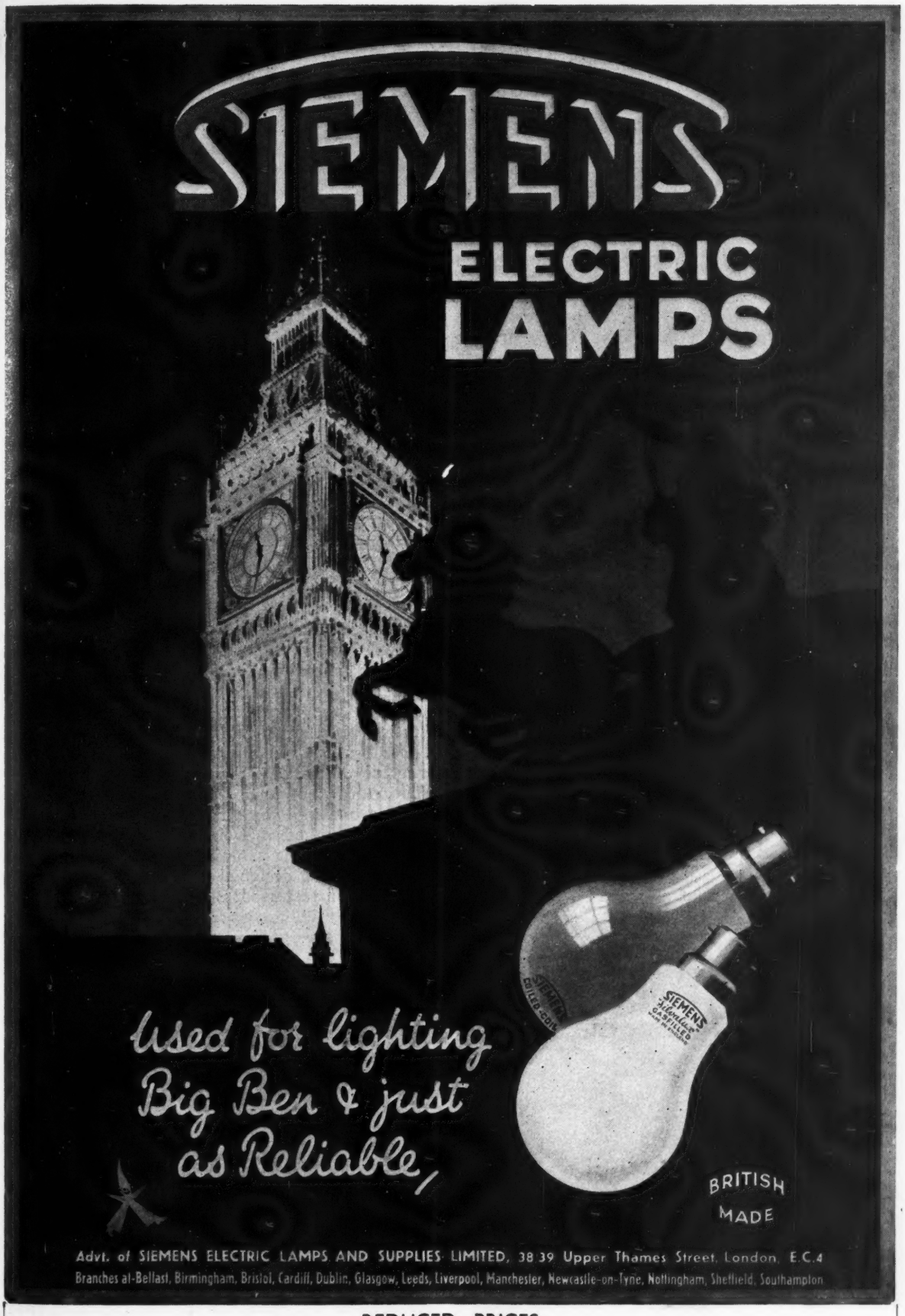
The author then turned to sources involving the production of light from electrically excited atoms, which he illustrated by views of spectra of mercury, sodium, cadmium, and neon. Dealing with the sodium lamp he quoted average efficiencies varying from 41 lumens per watt for the 50-watt lamp to 52 lumens per watt for the 150-watt lamp, during a life of 2,500 hours. In the laboratory, however, efficiencies as high as 200 lumens per watt have been attained. These high efficiencies are naturally a result of the fact that the radiation is practically confined to the yellow region of the spectrum. In the case of mercury lamps efficiencies for the low-pressure lamp, the 400-watt M.A. type, the 500 MB/H type, and the water-cooled 500-watt lamp are respectively 15, 45, 50, and 60 lumens per watt. This change in conditions is associated with internal pressures ranging from 1 mm. to 50 atmospheres and voltage per cm. of arc length from 1 to 400.

Fluorescent Powders.

The radiation of these lamps, with strong accentuation of the lines in the yellow and green, was illustrated, and the possibilities of the fluorescent lamp were discussed. Powders are available which fluoresce in almost every shade of colour, though not all are suitable for use in this way. Efficiencies ranging from 30 to 40 lumens per watt can be secured by their use in tubes of about one metre in length and consuming approximately 25 watts.

Rivalling the Brightness of the Sun.

In the final section of the paper allusion was made to the new high-pressure 80-watt and 125-watt mercury lamps and to the approach to the daylight spectrum secured in 500-watt lamps of the high-pressure type. Such lamps are, however, being developed mainly for projection work. They have a maximum brightness of about 20,000 candles per sq. cm., as compared with 850 candles for the arc of the 125-watt mercury lamp, and 150,000 candles for the sun. Brightness in such lamps, however, is not evenly distributed, and a peak value of the order of 60,000 candles per sq. cm.—actually about one-third of that of the sun—has been observed.


SIEMENS
ELECTRIC
LAMPS
Used for lighting
Big Ben & just
as Reliable,
BRITISH
MADE
Advt. of SIEMENS ELECTRIC LAMPS AND SUPPLIES LIMITED, 38/39 Upper Thames Street, London, E.C.4
Branches at Belfast, Birmingham, Bristol, Cardiff, Dublin, Glasgow, Leeds, Liverpool, Manchester, Newcastle-on-Tyne, Nottingham, Sheffield, Southampton

REDUCED PRICES

Further Notes on the A.P.L.E. Exhibition

(Bournemouth, Sept. 5—8, 1938).

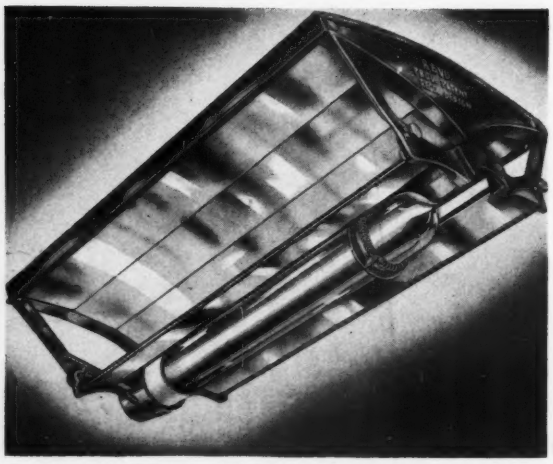
A view of the stand of the General Electric Co., Ltd., where there was on view a wide range of street lighting equipment, supplemented by photographs of typical installations; flood-lighting units; traffic control apparatus, and a model demonstrating the use of centralised street lighting control.

A night photograph of the new indoor Bowling Green at Bournemouth, illuminated by special Holophane fittings mounted direct on the ceiling. The fittings which are placed well out of the range of vision, permit a clear view throughout this large interior, and afford strong and even illumination on the artificial "green" below.

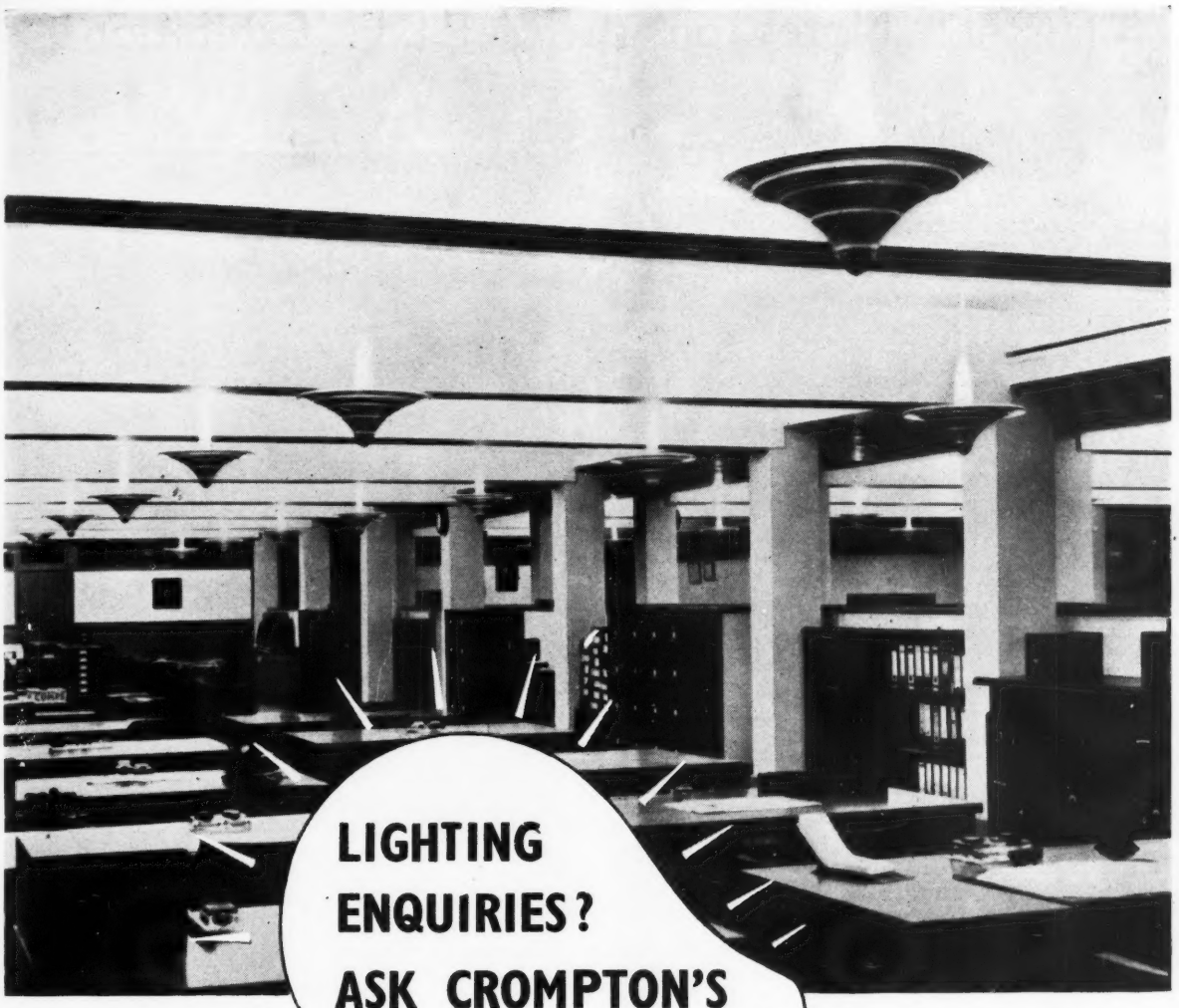
The Hawthornes Hotel, Bournemouth, floodlighted by "Sieray" discharge lamps.

In our last issue (p. 205, September, 1938) we illustrated the floodlighting of the Royal Pavilion and Gardens at Bournemouth. It was interesting to note also how generally floodlighting is being applied to the hotels. An instance is afforded by the adjacent picture of the Hawthornes Hotel, for which four Siemens "Oxford" horizontal and four "Brentford" vertical floodlights, equipped with Sieray primrose discharge lamps, were used. The combination of the vertical and horizontal elements, merging one into the other, was considered a very successful method of avoiding the bleakness of hard shadow and giving a pleasing diffusion effect. The installation was designed by Messrs. Aish and Co., electrical contractors, of Bournemouth.

At the stand of the British Thomson-Houston Co. Ltd., illustrated above, pictures and diagrams revealing the qualities and applications of street lighting equipment were in evidence. One of the main features was the new B.T.-H. Mercra "H" lantern for use with horizontally burning electric discharge lamps.



The Revo (C.9325) Street Lighting Unit designed for 50 w., 65 w., 100 w., and 150 w. sodium lamps, with special mirror equipment, one of a number of units for public lighting displayed at the stall of the Revo Electric Co., Ltd.



Indirect Lighting for Messrs. Goodlass Wall and Lead Industries Ltd., designed by The Crompton Illumination Service in co-operation with the electrical contractors responsible for the installation.

Photograph by kind permission of Messrs. Goodlass Wall and Lead Industries Ltd.

LIGHTING ENQUIRIES? ASK CROMPTON'S HELP

To-day the expert knowledge of the lighting engineer is being called on to a greater extent than ever before. Factories, workshops, offices and streets are all presenting new and pressing problems in lighting. The effect of the advertising of the combined E.D.A./E.L.M.A. concerning the new Factories Act has made industry alive not only to the possibilities of good lighting but to the necessity for it.

To help the busy lighting engineer responsible for the planning and execution of the many new installations required, the Crompton Illumination Service has been specially created.

This service puts a group of expert lighting engineers at your disposal. Unusual enquiries or any difficulties can be referred to them and they will, if you wish, make surveys for you and recommend layouts.

This service is available without charge. It exists solely to keep light users up-to-date on lighting problems, to help industry to achieve the extra light modern high-speed working conditions demand and to make still more widely known the increased efficiency, economy and reliability of Crompton Lamps.

CROMPTON PARKINSON LTD.

Telephone: Temple Bar 5911 & 2444
Telegrams: Crompark Bush London.

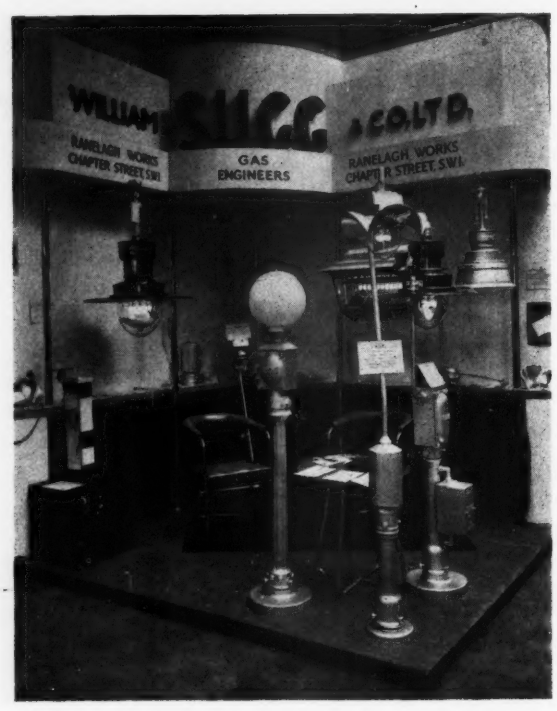
Bush House, London, W.C.2.

Prices Now Reduced

Further Notes on the A.P.L.E. Exhibition

(Continued from page 238)

Exhibit of William Sugg and Co., Ltd.



We give above a view of the stand of William Sugg and Co., Ltd., at the A.P.L.E. Exhibition at Bournemouth. This representative display included:—

Three High Efficiency group "A" lighting units, the "London" "Folkestone," and "Rochester" lamps, were shown in lighting. The "London" and "Rochester" lamps are of the non cut-off type, and are very widely used throughout the country. The "Folkestone" lamp, which was first introduced a year ago, is of the cut-off type. Several very effective installations are in service, and a high degree of visibility has been obtained.

The "8,000" lamp for group "B" lighting was also in lighting, the particular model shown having three-way reflectors for the lighting of intersections. Another model with a cased clock controller fitted beside the lamp was also shown.

A system of light actuated control for gas lamps was demonstrated, the equipment being fitted to an upright "Rochester" lamp. This apparatus, which consists of a photo-electric cell operating a special clock controller through a relay is ideal for the lighting of refuges and roundabouts, and ensures dusk to dawn lighting, and will also light up the lamps in case of fog or dangerously dark weather during the day.

A safety cut-off valve for gas-lighted bollards has been designed to prevent escape of gas in case the bollard is knocked down and a model on the Stand enabled this to be shown in use. Such have already been applied to 500 gas-lighted bollards in the area of one company alone.

The three group "A" lamps were fitted with Comet remote control, a new system of distant control using Comet ignition instead of by-pass, which has special advantages for railway, church, shop, and factory lighting.

Another exhibit was a refuge indicating lamp to comply with the M.O.T. requirements, but having a minimum gas consumption.

"Wask" Raising and Lowering Gear

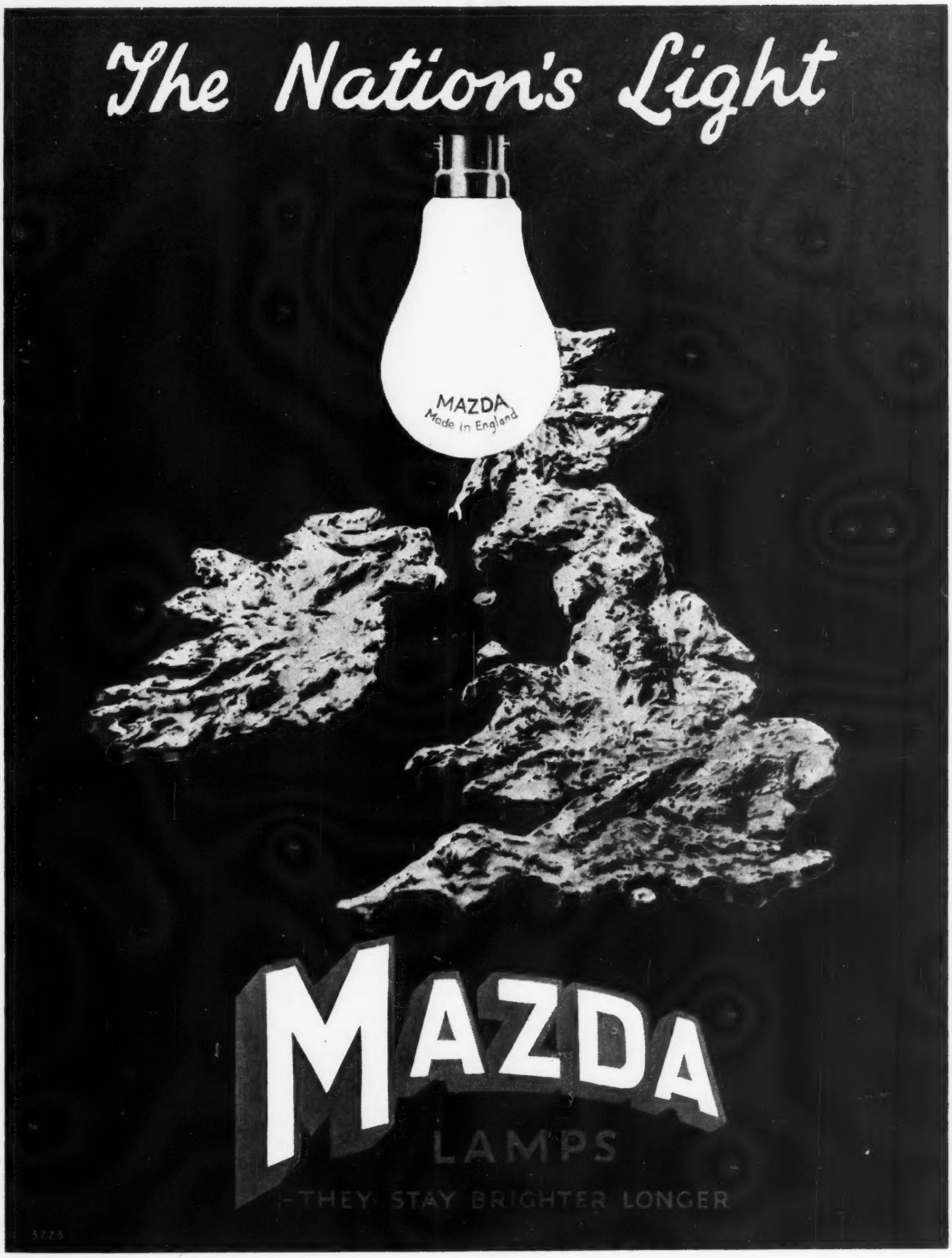
The view of a street in Exmouth is typical of many where the "Wask" raising and lowering gear, exhibited by Walter Slingsby and Co., Ltd., is in use. Models illustrating the operation both of gas and electric lamps were shown. The gear can be fitted to lamps at any height and with any overhang and is of considerable aid when the M.O.T. recommendations specifying a mounting height of 25 ft. have to be met. Various useful brackets and extension pieces for adoption with existing poles were also shown. Such equipment is often of great assistance when the lighting of side roads is to be brought up to date and the height of suspension raised.

The Barnet-Sieray Lantern

The new Barnet-Sieray lantern exhibited by Siemens Electric Lamps and Supplies, Ltd., is designed on similar lines to the Regent-Sieray lantern and with the same light-distributional features, but is of a more decorative type. The Albion-Sieray lantern (for horizontal lamps) and smaller lanterns for 80 w. and 125 w. lamps were also shown.

A New G.E.C. Lantern

The adjacent picture shows the new G.E.C. Difractor lantern for use with Osira electric discharge (mercury vapour) lamps. Attention may be drawn to the compact nature of the unit and the ease with which it can be dismantled for maintenance purposes.



MAZDA COILED-COIL LAMPS GIVE UP TO 20% MORE LIGHT THAN ORDINARY GASFILLED LAMPS

THE BRITISH THOMSON-HOUSTON CO., LTD. CROWN HOUSE, ALDWYCH, LONDON, W.C.2

Public Lighting at the World Power Conference

This country was well represented at the World Power Conference, which took place in Vienna during August 25—September 2. Visitors had an instructive and agreeable time. They were much impressed by the natural beauties of the city and the very effective way in which floodlighting is applied —largely as a result of concerted efforts by supply undertakings, contractors, and manufacturers.

Sections of the Conference dealt with: The Supply of Energy for (a) Agriculture, (b) Public Lighting, (c) Domestic Purposes. The supply of electricity for small scale industries (d) was also the subject of special study. There were sixty-five papers dealing with topic (a). Discussion turned largely on tariffs and the grouping of rural areas for energy supply on moderate terms. Of special interest was the experience in such countries as Germany and Bulgaria, where State subsidies are favoured. Forms of two-part tariffs also figured largely in the discussion of (c). The special problems presented by large blocks of flats were mentioned in several papers. In regard to (d) the British paper by White and Clough emphasised the immense field open for development. It was indeed estimated that the potential consumption by factories, restaurants, shops, schools, hotels, etc., was 500 times as great as the present consumption of electricity in Great Britain!

The section of greatest interest to readers of this journal was naturally that dealing with Public Lighting, in connection with which seventeen contributions were presented, including several by British representatives. The desirability of establishing a "safety standard" of lighting was emphasised, and a resolution was passed advocating the collection of statistics bearing on the relation between street lighting and accidents. Other points which aroused comment were the colour-correction of light from discharge lamps—and in this field representatives of Great Britain with their wide experiences of roads lighted by discharge lamps were able to emphasise the great importance of good visibility as outweighing considerations of colour—and desirable spacing and mounting heights. German representatives advocated a spacing of 30-40 metres, not widely different from the approved figure here, and a height of 10 metres, which is somewhat greater than that approved in Great Britain A matter raised incidentally was the lighting of house numbers, which appears to have been taken up very energetically in Budapest.

Public lighting was treated in three contributions by British representatives: Street Lighting in Great Britain by Dr. H. F. Gillbe, Electric Lighting for Streets and Transport by W. J. Jones, and Public Lighting by Gas by A. R McGibbon and W. J. Davey

Dr. Gillbe's paper commenced by summarising the present legal aspects of public lighting, pointing out that the Acts hitherto in force were permissive only, i.e., the provision of street lighting by authorities was not an actual legal obligation, except in some degree in Scotland. This led to a summary of circumstances leading to the appointment of the M.O.T. Committee, an explanation of the chief features of the British Standard Specification for Street Lighting, and an excellent summary of the contents of the M.O.T. final report—now familiar to British experts, but very useful to experts abroad. An instructive table showed the steady increase in consumption by gas (from 7,023 to 13,307 million cub. ft.) and by electricity (from 49.5 to 270.8 million k.w.h.) during the past fifteen years. Other data related to the number of authorities concerned and the consumption per mile and per head in metropolitan boroughs, municipal corporations, and urban district councils.

It was pointed out that the consumption of electrical energy per mile for traffic routes lighted to the M.O.T. standard would be about 88,000 k.w.h. for filament lamps, or 44,000 k.w.h. for discharge lamps; for gas the corresponding figure would be 6 million cub. ft. with low pressure or 3¼ million cub. ft. with high pressure. The corresponding total annual consumptions would be 880 million k.w.h. for filament lighting and 440 million k.w.h. for electric discharge lamps; 60,000 million cub. ft. of gas at low pressure and 32,500 million cub. ft. at high pressure.

Statistics for 1935 for nearly 34,000 miles of roads in urban areas showed that 57.9 per cent. of the total mileage was then lighted by gas and 42.1 per cent. by electricity. Only about 2½ per cent. of electrically lighted roads used electrical discharge lamps, and only about 1 per cent. of gas lighted roadway was treated with high pressure gas lamps. (Doubtless, the percentage of roadway lighted by discharge lamps has increased considerably since that date.)

Mr. W. J. Jones's paper opened with the remark that the last ten years have been marked by intense activity in the extension of electricity, and recalled the decision, in 1925, to recommend as a standard 230 volts, to which subsequent changes have gravitated. Local distribution of electricity is undertaken by no fewer than 622 authorised undertakings, and there are 2,500 street lighting authorities. An instructive table summarises the use and performances of electric discharge lamps. Since the introduction of such lamps in 1932 more than 50,000 have been installed in over 1,500 miles of streets. Methods of colour-correction were briefly discussed, but it was remarked that in general the colour has not proved a deterrent to their use. A diagram contrasted the continuous rise in consumption of electricity for public lighting during the period 1923 to 1935 with the simultaneous fall in the price per k.w.h. It is estimated that the potential consumption of electricity for public lighting is 1,100 million units. Diagrams illustrate the cost, to a number of different undertakings, of all-night lighting with 100 watt and 500 watt lamps.

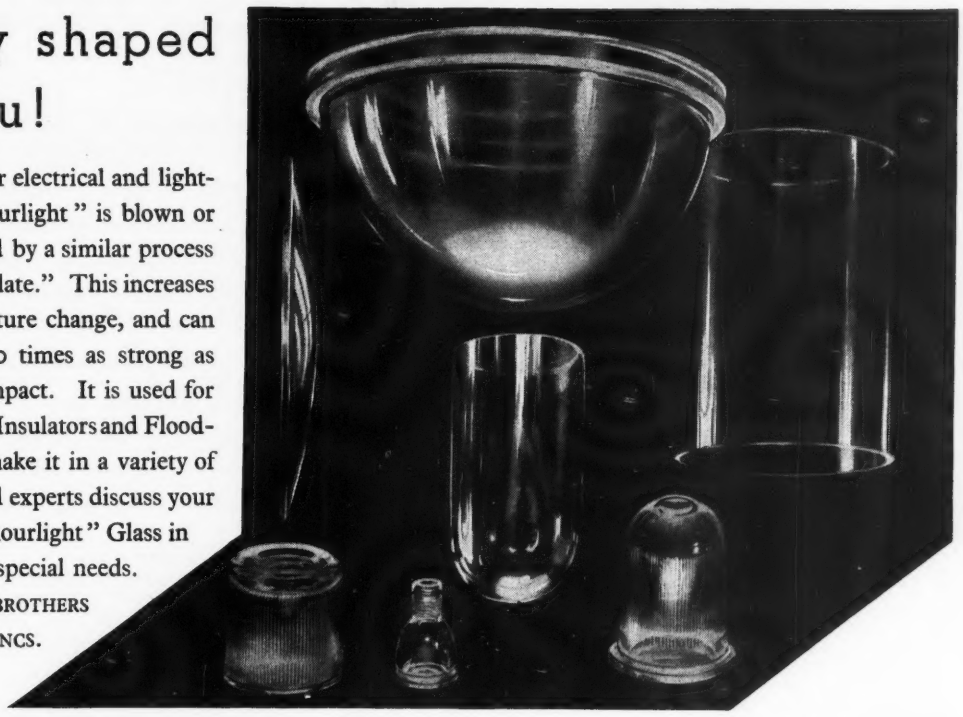
In our next issue we will summarise the remainder of Mr. Jones's paper, which deals with various other allied applications of electric lighting, and the paper by Mr. A. R. McGibbon and Mr. W. J. Davey, who dealt with Public Lighting by Gas in relation to statistics and control.

(To be continued.)

Transparently tough—

but easily shaped to suit you!

Here's a new material for electrical and lighting equipment! "Armourlight" is blown or moulded glass toughened by a similar process to the famous "Armourplate." This increases its resistance to temperature change, and can make it 5, 10 or even 20 times as strong as ordinary glass against impact. It is used for Convexes and Cylinders, Insulators and Floodlight Glasses. We can make it in a variety of shapes. Let our technical experts discuss your problem and make "Armourlight" Glass in a shape that meets your special needs. Write to PILKINGTON BROTHERS LIMITED, ST. HELENS, LANCS.



'ARMOURLIGHT' GLASS

"ARMOURLIGHT" IS THE REGISTERED TRADE MARK OF PILKINGTON BROTHERS LIMITED
A.43

Exhibit of W. Parkinson & Co.

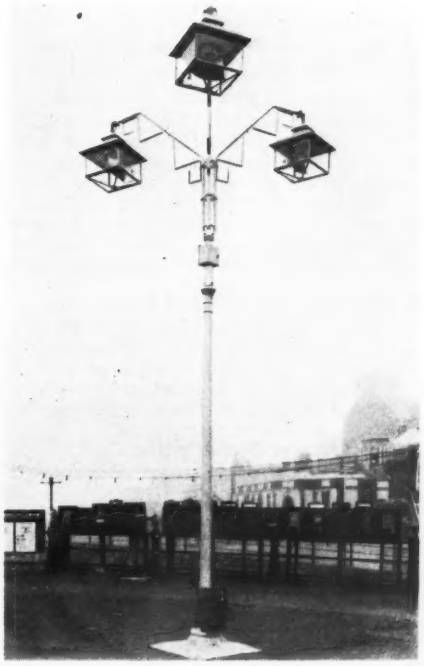
The Maxill "G" lamp, here shown, was one among many gas-lighting units shown at the A.P.L.E. Exhibition by W. Parkinson and Co. Features are the system of adjustable reflectors and the convenient manner in which the whole of the interior of the lamp can be removed *in situ*—a lamp specially useful for Group "A" lighting.

There are also on view several lamps of the Maxill 12-light standard type, one of which was designed to enable the number of effective mantles to be diminished at any desired time.

Other types included the "Maxilla," the "Brimax Maxilla," and the Maxilla frog and suspension types. The Maxilla lamp is specially intended to meet the requirements of the M.O.T. Final Report for Group "B" Lighting, and is available for six mantles.

A view of the Maxill "G" Lamp.

The Brimax Maxilla, which incorporates a swan-neck attached to the waist, and is of pleasing appearance, has a case constructed on similar lines to the larger Maxill lamps, thus permitting uniformity of appearance on Group "A" and Group "B" roads. The frogs available with these lamps, 9 in. to 386 in. in length, enable uniformity of mounting height to be readily secured in cases where there is at present variation in this respect.



A triple Maxill Lamp for pier-lighting at Margate.

Literature on Lighting

(Abstracts of Recent Articles on Illumination and Photometry in the Technical Press)

(Continued from page 211, September, 1938.)

I.—PHOTOMETRY.

245. Measure Diffusion of Street Light Globe.

Anon. El. World, 110, p. 614, August 27, 1938.

A scheme is outlined for measuring the "diffusing quality" of bowls such as used largely for street lighting in America. By measuring photo-electrically the intensity given by the complete globe and that given by the portion of the globe, excluding the bright patch in direct line with the filament, a figure indicating the diffusion produced by the bowl is obtained in the ratio of these two values. The globe is arranged to rotate on its axis while the measurements are being made. S. S. B.

246. Reflection and Transmission Factors of Thin Metallic Foils.

Pierre Rouard. Rev. d'Opt., Vol. 17, No. 3, p. 89, March, 1938.

The third articles of the series, giving results obtained by the author and others on foils of silver, gold, platinum and other metals for radiation of various wave-lengths. R. G. H.

III.—SOURCES OF LIGHT.

247. The Discharge Lamp.

E. C. Lennox. El. Rev., Vol. CXXIII., No. 3,171, p. 313, September 2, 1938.

The advantages of the discharge lamp for public lighting are summarised. A comparison of the costs of tungsten filament, sodium discharge, and mercury discharge lamps is given. Reduction in price of the lower wattage mercury discharge lamps is suggested in order to stimulate the progress which street lighting has made in recent years. R. G. H.

IV.—LIGHTING EQUIPMENT.

248. Exhibition of Lighting Equipment.

Anon. El. Rev., Vol. CXXIII., No. 3,172, p. 346, September 9, 1938.

Describes, with illustrations, the public lighting equipment exhibited at Bournemouth to the Association of Public Lighting Engineers. A feature of the exhibition was the number of new systems of street lighting control that were shown. R. G. H.

249. Lamps and Lanterns.

Harold Bright. El. Rev., Vol. CXXIII., No. 3,171, p. 316, September 2, 1938.

Recent developments in lighting equipment have centred in designs for electric discharge lighting. "Black" lamps for stimulating luminescent powders for decorative and other effects are a recent introduction. Combined tungsten and mercury lighting units for shop window lighting also have recently been introduced. R. G. H.

250. Malleable Poles Stand 3-ton Load.

Anon. El. World, 110, p. 601, August 27, 1938.

A description is given of malleable iron poles used at Pittsburgh in a recent installation. Full details of the pole dimensions and construction are given, and also the results of a loading test to destruction of a pole. S. S. B.

251. Underwater Floodlights.

Anon. El. World, 110, p. 485, August 13, 1938.

This floodlight employs a special thermo-pressure treatment to eliminate water seeping into the unit, thus rendering unnecessary either drainage or ventilation. The unit must not be operated unless completely submerged. S. S. B.

252. Low-Voltage Lighting.

H. C. Cooper. El. Rev., Vol. CXXIII., No. 3,172, p. 353, September 9, 1938.

Discusses the requirements of transformers for low-voltage lighting. The importance of close regulation is stressed, small variations in voltage having a large effect on the life of the lamps. Distribution systems and lighting equipment are also discussed. R. G. H.

253. Metal Base for Cinematograph Films.

Anon. Kinematograph Weekly, Vol. 259, No. 1,641, p. 37, September 9, 1938.

The discovery of a new alloy which overcomes previous difficulties will reopen the possibilities of using metal as a base for cinematograph films. The new alloy is said to have a flawless, close-grained, flexible surface with a reflective index of 92 per cent. The new optical system involved causes some loss of light, but the results are claimed to be excellent for colour work. H. N. C.

V.—APPLICATIONS OF LIGHT.

256. The World Power Conference.

W. J. Jones. El. Rev., Vol. CXXIII., No. 3,172, p. 348, September 9, 1938.

A report of the World Power Conference at Vienna. Abstracts of the papers are given, and also the trend of Continental thought on public lighting. The shop and interior lighting of Budapest appealed to the author and other delegates. R. G. H.

257. A Review of the Report of the Ministry of Transport Departmental Committee on Street Lighting.

J. M. Waldram. G.E.C. Journal, IX., No. 3, pp. 191-196, August, 1938.

The Report of the Ministry of Transport Departmental Committee on Street Lighting is reviewed in detail. C. A. M.

258. Public Lighting Conference.

Anon. El. Rev., Vol. CXXIII., No. 3,172, p. 343, September 9, 1938.

A report of the conference of the Association of Public Lighting Engineers at Bournemouth. Abstracts of all the papers are given. R. G. H.

259. Lighting and Road Development.

C. W. M. Phillips and F. K. Garry. El. Rev., Vol. CXXIII., No. 3,171, p. 315, September 2, 1938.

The mechanics of daylight vision and of vision by night in artificially lighted streets are similar, in that objects are seen dark against the brighter background of the road surface. "Controlled cut-off" lighting is said to satisfy all the requirements of street lighting. R. G. H.

260. Fluorescent Lighting at Bingley.

Anon. El. Times, 94, p. 261, August 25, 1938.

A photograph and a description are given of a new street-lighting installation at Bingley, in which luminescent mercury discharge lamps have been used. A three and a half mile stretch of road is lit with 140 lamps. W. R. S.

261. Sodium at Intersections Cuts Accidents 27 per cent.

Anon. El. World, 110, p. 578, August 27, 1938.

Additional lighting, using sodium vapour lamps, has been provided at a number of extra-dangerous street intersections in Chicago; and records are being kept, from which the value of the better lighting, it is hoped, will be shown. The average illumination has been increased five to six times, but the mounting height is only 20 ft. 6 in. Insufficient data for full analysis has yet been obtained; but the total number of fatal accidents has dropped 27 per cent. since the installation of the extra lighting. The authorities consider the distinctive colour of the sodium light at the dangerous points beneficial, and also state that local filament lighting on the side-walk prevents colour distortion of features proving seriously objectionable. S. S. B.

262. Special Lighting Designs Used by Tennessee Utility for Tunnel.

Anon. El. World, 109, p. 2,135, June 25, 1938.

Some details are given of the lighting scheme adopted for the lighting of a tunnel in America. The main lighting is provided by sodium vapour lamps in special fittings, and grading lights using filament lamps are used at each end to reduce the sharp change in intensities from daylight to the interior of the tunnel. S. S. B.

263. Taking Stock of Light.

"Pharos." Elect., 121, p. 232, August 26, 1938.

A discussion, arising out of the lighting requirements of the new Factory Act, is given on the determination

Please give Generously

NOV. 11 REMEMBRANCE DAY

BRIGHT LIGHT WITHOUT GLARE

Authorities are agreed that much of the prevalent eye strain and defective sight can be avoided by eliminating the dazzling glare of incandescent gas mantles and other high power lighting units. In practice, Vitreosil (pure fused silica) has proved one of the most efficient available means of diffusing glare without undue loss of light. Vitreosil also possesses unique decorative value and complete heat resistance.

Vitreosil Globes, Bowls and Reflectors for all domestic and industrial needs are supplied. Illustrated Lists and Trade Terms from the Sole Manufacturers:

THE THERMAL SYNDICATE LTD.,
Head Office & Works: Wallsend, Northumberland.
London Depot: 12-14, Old Pye Street, Westminster, S.W.1.

VITREOSIL

of the optimum illumination value for a given industrial process. A suggestion of group replacement of lamps in industrial installations is made. C. A. M.

264. Legislation and Factory Lighting.
W. Robinson. El. Rev., Vol. CXXIII., No. 3,171, p. 304, September 2, 1938.

Factory lighting improvements should not be held up pending the forthcoming report of the Departmental Committee on factory lighting. The minimum illumination requirements of the various committees since 1915 are reviewed. Lighting improvements should aim at values well above the minima recommended. R. G. H.

265. Chart Eases Design of Localised General Lighting.
Davis H. Tuck and Kurt Franck. El. World, 110, p. 281, July 30, 1938.

A proposal is put forward that the distribution curve of a lighting fitting should be plotted on rectangular co-ordinates in the form of a modified Rousseau diagram, as presenting the performance of the unit more clearly. To aid the calculation of illumination values further, a very comprehensive chart has been prepared, so that given any factors in the lay-out of an installation, the related quantities can be read off in a simple manner. S. S. B.

266. Small Town Store Uses 150 Foot-Candles.
T. E. Roche. El. World, 110, p. 480, August 13, 1938.

In a small town jewellery shop, a combination of intensive direct lighting on the counters and indirect trough lighting is employed. A general lighting level of 25 foot-candles is obtained, with 150 foot-candles on the counters. Details of the lighting scheme are given. S. S. B.

267. Utility Relights from Stem to Stern.
Anon. El. World, 110, p. 478, August 13, 1938.

An American utility company's premises have been relighted completely to modern standards. The schemes adopted for different sections are described, including details of the decorations, designed for high efficiency of utilisation of the light. S. S. B.

268. Roof Lighting at London Guildhall.
El. Times, 94, p. 225, August 18, 1938.

A photograph and brief description are given of the floodlighting of the roof (interior) of the main hall at the London Guildhall. Fourteen 1,000-watt floodlights were used. W. R. S.

269. Fluorescent Tube Lighting.
H. G. Jenkins and C. Dykes Brown. G.E.C. Journal, IX., No. 3, pp. 163-175, August, 1938.

The use of fluorescent tubes for interior lighting is discussed in detail. Numerous examples of installations are shown with photographs. C. A. M.

270. Light in Advertising.
H. S. Scott. El. Rev., Vol. CXXIII., No. 3,171, p. 311, September 2, 1938.

Co-operation between illuminating engineer and architect has produced a new technique in discharge tube display lighting. The development of the fluorescent lamp has given the designer pastel shades which can be applied with taste and restraint. Effective maintenance is a big problem for the supplier of advertising lighting equipment. R. G. H.

271. Lighting as Decoration.
E. H. Penwarden. El. Rev., Vol. CXXIII., No. 3,171, p. 309, September 2, 1938.

A summary of present-day practice in decorative lighting. Novel schemes of home lighting are suggested, and the part to be played by fluorescent discharge lamps in future schemes of decorative lighting is emphasised. R. G. H.

272. Floodlighting.
A. Mansell. El. Rev., Vol. CXXIII., No. 3,171, p. 306, September 2, 1938.

Floodlighting for ornamental and industrial applications is discussed, with diagrams and photographic illustrations. Recommended illumination values are given, and the beam spreads of different types of projectors are tabulated. R. G. H.

273. Southend-on-Sea Illuminations.
Anon. El. Times, 94, p. 146, August 4, 1938.

Gives a page of photographs of the "Never-Never Land" lighting. Special effects are obtained with fluorescent lighting. W. R. S.

Recent Patents

(Abstracts of recent Patents on Illumination & Photometry.)

No. 488,047. "Improvements in High-Pressure Mercury-Vapour Electric Discharge Lamps."

The General Electric Company, Limited, and Ryde, J. W. Dated May 11, 1937.

This specification describes a high-pressure mercury-vapour lamp in which the discharge between the main electrodes is stabilized and located by one or more insulated electrodes substantially between the main electrodes, the discharge passing in a series of discharges from electrode to electrode.

No. 489,051. "Improvements Relating to Metal Vapour Electric Discharge Lamps."

Siemens Electric Lamps and Supplies, Limited, Aldington, J. N., and Meadowcroft, A. J. Dated March 23, 1937.

According to this specification there is combined with a high-pressure metal vapour discharge lamp, having one or more convolutions or bends along its length, artificial cooling arrangements whereby the portions of the lamp adjacent the electrodes are maintained at substantially the same temperature and cooler than the other portion of the lamp. The lamp may take the form of a bight or a spiral or of a number of parallel limbs connected by bends. The whole may be mounted in an envelope with a tubular partition surrounding the lamp and cooling fluid may be passed there-through.

No. 489,182. "Improvements in or Relating to Electric Battery Lamps."

The Ever Ready Company (Great Britain), Limited, and Terry, M. C. Dated January 28, 1937.

This specification covers a battery lamp or torch comprising a gas-tight contact chamber housing a pair of contacts for controlling the light circuit, normally resiliently spaced apart, and a head movably connected to the chamber and carrying a bulb holder so that the bulb thereof is normally in abutting contact with one of the two contacts which is displaceable by the bulb on relative movement between the head carrying the bulb and the chamber so to complete the circuit. The second of the two contacts is in permanent connection with the battery terminal. The head carrying the lamp bulb moves axially of the battery casing.

No. 489,186. "Improvements in and Relating to Systems of Illumination."

Claude General Neon Lights, Limited, Collins, T. L., and Higgins, C. Dated February 9, 1937.

This specification covers a lighting system in which an alcove or recess or other area is illuminated by blended light derived from concealed light sources comprising parallel discharge tubes emitting light of various colours. Opaque or semi-opaque slats are interposed between the light sources and the area to be illuminated, and these slats are of different colours and modify the colour tones of the lighting of portions of the area.

No. 489,238. "Improvements in and Relating to Electric Discharge Lamps."

The British Thomson-Houston Company, Limited. Dated January 25, 1936. *(Convention, U.S.A.)*

This specification describes a discharge lamp of the high or extra high-pressure type in which the lamp bulb is enclosed in an outer envelope containing gas. The bulb is cooled in normal operation without the aid of water cooling, and the gas consists wholly or mainly of helium, which has a pressure under non-operating conditions such as to become higher than atmospheric under normal operation, whereby the pressure or current of the lamp may be increased without heating the bulb to its softening temperature. The gas mixture may be 75 per cent. helium and 25 per cent. nitrogen.

No. 489,255. "Improvements in or Relating to Electric Lamps."

Birdseye Electric Corporation. Dated November 2, 1936. *(Convention, U.S.A.)*

According to this specification the contact base of an electric lamp which fits into a socket is connected to the neck of the bulb by an adjustable non-resilient flexible portion so that the lamp may be given any desired angular adjustment with respect to the socket. The flexible portion may be bellows-like.

No. 489,361. "Improvements in Mercury Vapour Lamps."

Gobel, O., and Riegelhaupt, H. Dated October 23, 1935, *March* 24, 1936. *(Cognate Applications), (Convention, Austria.)*

In order to complete the circuit of a mercury vapour lamp in starting without tilting the lamp, the lamp is provided with one or more reservoirs of expansible and resilient material which are closed to atmosphere. The reservoirs may be connected to the lamp by flexible tubes and may be raised to increase the quantity of mercury in the tube, thus to bridge the electrodes and strike the arc.

No. 489,453. "Improvements in and Relating to Methods of Manufacturing Luminescent Material."

The British Thomson-Houston Company, Limited. Dated April 22, 1936. *(Convention, U.S.A.)*

According to this specification luminescent materials such as cadmium-oxide-silica-manganese composition or zinc-oxide-silica-manganese composition are improved as regards their luminescent properties and otherwise by heating for a prolonged period to about 1,000°C. and quenching in a liquid, such as water.

No. 488,846. "Improved Devices of the Kine Comprising at Least Two Parallel Connected Electric Discharge Tubes."

N. V. Philips Gloeilampenfabrieken. Dated March 30, 1937. *(Convention, Germany.)*

According to this specification, when two or more gas-filled discharge tubes are connected in parallel, the incandescent electrode, or heating element thereof, of one tube is connected to the secondary winding of a transformer of which the primary winding is connected in series with the discharge path of another tube. Thus, the starting of that other tube initiates the starting of the first-mentioned tube and so on throughout a series.

PHOTOMETERS
OF ALL TYPES

EVERETT EDGCUMBE make a complete range of PHOTOMETERS employing the well-known AUTO-PHOTIC CELL for every kind of light measurement.

List Price 44/-

● **VEST POCKET LIGHTMETER.** Notwithstanding its small size the Vest Pocket Lightmeter has the characteristics of the larger "Autophotic" Portable Photometers. The scale is specially designed to utilise to the best advantage the extreme handiness and portability of the meter.

● **AUTO-PHOTOMETER** for demonstrating the illumination in large and small spaces. A minimum full scale reading of 2.5 foot-candles can be provided on the lowest range, and there is no practical limit to the maximum range. The separate Autophotic cell can be placed in any position independent of the indicator. A simple attachment which, when fitted to the Autophotic test plate, enables the daylight factor to be read direct.

● **HOLOPHANE - EDGCUMBE STREET LIGHTING PHOTOMETER.** — Measurement of illumination as low as 0.005 foot-candle (which is half the recognised minimum) is now possible with this remarkable instrument. True indications at large angles of incidence, accuracy with lights differing widely in colour, and complete portability are other features.

● **CUBE PHOTOMETERS** for lamp testing in bulk with ease and rapidity. Essential to lamp manufacturers, factors, Illuminating Engineers, and users of lamps in large quantities. An unique compensating device for obscuration enables the efficiency of complete fittings to be tested.

● **POLAR CO-ORDINATE OR DIRECTIONAL PHOTOMETERS** for measuring distribution of luminous flux of lamps and the efficiency of lanterns and fittings.

Write for Catalogue

EVERETT EDGCUMBE

Manufacturers of all kinds of indicating and recording electrical instruments and photometry experts.

COLINDALE WORKS
LONDON, N.W.9

Electric Street Lighting

Bingley.—On August 15 a new main road lighting scheme covering three miles and comprising 150 fluorescent electric discharge lamps was inaugurated. The columns are arranged in staggered formation, at a spacing of approximately 120 ft. The lighting is controlled by a direct current bias system from a single point at the electricity works. The scheme has cost approximately £3,000, and will shortly be extended by the addition of a further thirty-seven units covering approximately three-quarters of a mile.

Finchley.—250-watt horizontal type mercury lamps are to be installed for the lighting of Finchley High Road and Great North Road.

Guildford.—A new installation of twelve 250-watt mercury discharge lamps is now in commission on that portion of Woodbridge Road where dual carriageways are under construction. Lamps are mounted on concrete standards. Road users have been well impressed with the visibility obtained, and similar lighting is proposed along London Road from Burpham towards the town, but with 400-watt lamps.

Henley.—Street lighting at Henley has averaged £802 14s. 8d. per annum during the past three years. The Council has now decided to provide further electric lighting by the provision of 200-watt suspension type lamps in various streets, bringing the annual cost to £853 10s. per annum. This, however, will be reduced in eighteen months to £704 10s. per year when the cost of the existing installation has been completely paid.

Lewisham.—It will be recollected that Lewisham was one of the first authorities to adopt mercury discharge lighting on a large scale. Improvements in side street lighting are now proposed. An additional annual maintenance and running charge of approximately £10,565 is contemplated. 1,620 new standards will be necessary, at an approximate cost of £7,000. The minimum mounting height for all side road columns will be 15 ft., and the hours of lighting will be increased to 4,100 per annum.

Leyland.—At the last meeting of the Council it was decided to make application to the Ministry of Health for consent to borrow £1,250 for the installation of 150-watt mercury discharge lamps from Old Cross to the boundary at Farington.

Liverpool.—The annual report of the Lighting Engineer reveals that sodium lighting was considerably extended during the year, 740 lamps having been fixed and converted in more than sixteen miles of streets.

Moffat.—At a recent meeting of the Moffat Town Council the Convener of the Lighting Committee reported on the advisability of installing 125-watt mercury discharge lamps in the High Street. It was shown that the installation cost would be £7 17s. per lamp, and that the estimated annual saving over 300-watt filament lamps would be £1 10s. per lamp per annum. The Council approved the Lighting Committee's recommendation.

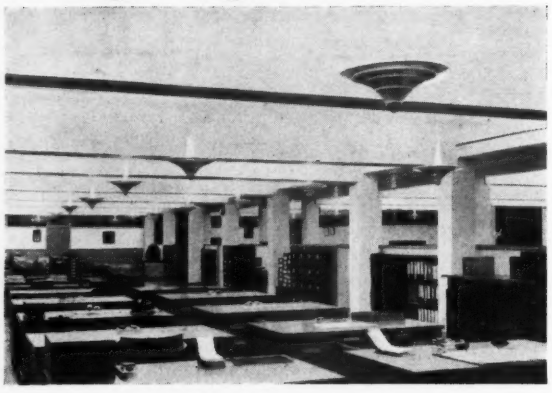
Shipley.—The Shipley Urban Council has approved the recommendation of the Highways and Buildings Committee. A scheme has been approved for the lighting of the whole of the Bradford and Keighley Road by mercury discharge lamps at an initial cost of £5,230 and an annual maintenance cost of £1,234, thus bringing the Bradford Road lighting into line with M.O.T. Final Report recommendations. Application is to be made to the Minister of Health for sanction to borrow £2,230 for the work.

Slindon, Chichester.—An electric street lighting installation has now been placed in commission in the village.

Tiverton.—In March, 1936, the Council approved a scheme for lighting the main streets of the town by electricity at a cost of £500. Owing to the recommendations of the M.O.T. Final Report on street lighting, mercury discharge lighting at an estimated cost of £1,108 is to be substituted, and application is being made for sanction to borrow £1,125 for the purpose.

Troon.—As a result of street lighting experiments in which part of the business area of the town was lighted by electricity, the Troon Town Council has decided to extend the scheme to other parts of the burgh. A tender of £3,937 10s. for lighting equipment on classified roads and 'bus routes, and for £1,016 2s. 6d. for installation work on subsidiary roads, has been accepted, and the work is to be placed in hand immediately.

A Novel Indirect Lighting Installation



The above illustration shows the general office of Goodlass Wall and Lead Industries, Ltd., situated in the recently completed Ibex House, Minories (London). This office alone covers an area of over 7,000 sq. ft., and is virtually divided into two sections by means of a central gangway, flanked by pillars.

The ceiling in each of these sections is sub-divided by deep 18-in. beams into 12 ft. by 30 ft. bays. Three 300-watt indirect fittings per bay were installed, giving a spacing of 12 ft. by 10 ft., and a uniform illumination over the desks of 14 foot-candles was provided.

The construction of this new type of unit, which is being installed by Messrs. Crompton, Parkinson, Ltd., in a number of offices, is of interest. It is made entirely from high-grade aluminium, processed with a special anodic treatment, which provides a brilliant reflecting surface of high permanence and reflection factor. A special metal ring, encircling the outer edge of the reflector, is so arranged as to catch a small proportion of the light emitted by the lamp, and reflects this on to the highly polished bands of the underside of the reflector. A pleasing variation in light and shade, eliminating the impression of "heaviness," sometimes associated with indirect lighting fittings, is thus produced.

The electrical contractors associated with this installation are Messrs. Pulver and Co., Ltd. (London).

Natural and Artificial Lighting in Relation to Housing and Town Planning

A bulletin issued by the Health Organisation of the League of Nations (Vol. VII., Extract No. 11) summarises the views of an international committee of experts, on which Dr. H. Buckley and Dr. R. J. Lythgoe represented Great Britain. The report deals with methods of measuring insulation and studying the orientation of buildings, and the effects of ultra-violet and heat radiation in sunlight. In the section on Natural and Artificial Lighting recent researches on the relation between intensity of illumination and visual acuity are discussed, and standards are quoted. The criterion adopted in England, that positions in rooms where the daylight factor is less than 0.2 per cent. are regarded as insufficiently illuminated for ordinary purposes, is mentioned. It is particularly interesting to note the mention of the Recommended Values of Illumination of the Illuminating Engineering Society and the quoting of certain of the more important figures therein. An international bibliography, comprising 121 references, completes the booklet.

NOTES ON ILLUMINATING ENGINEERING ABROAD

(Specially Contributed—H.L.J.)

New Zealand.

The New Zealand Standards Institute has recently presented Recommended Values of Illumination. Copies of this "code" have been circulated for review and comment. It is the result of co-operation between the New Zealand Standards Institute, the New Zealand Electrical Traders' Federation, the Lighting Services Bureau, the Institute of Architects, the Transport Department of the Electric Supply Authority Engineers' Association, the Department of Scientific and Industrial Research, and the New Zealand branch of the British Medical Association. Domestic, factory, and office needs are treated in the code, which is divided into three parts—"Light and Vision," "What Constitutes Good Lighting," and "Proposed Code of Recommended Illumination Values."

According to the "New Zealand Electrical Journal" lighting activities in New Zealand have increased considerably. At the E.L.M.A. Lighting Service Bureau, Wellington, window display competitions and other events are frequently organised. The dealer and the public are alike informed systematically of the advantages to be gained from better lighting, in a similar way to the "Better Light, Better Sight" campaign in this country. An outstanding public lighting installation is the recent new equipment of the Mount Victoria Tunnel, in Wellington, for which 150-watt sodium lamps, mounted 18½ ft. high, are used. The spacing varies from 60 ft. in the centre of the tunnel to between 15 ft, and 10 ft. at the ends. The full load is switched on during the day, with a view to diminishing the contrast between daylight and tunnel-lighting intensities, but only half-load at night. The tunnel is 2,045 ft. long, 28 ft. wide and 22 ft. high. In all there are forty-five lights throughout the tunnel. Only those at both ends of the tunnel are shielded.

United States of America.

In a paper contributed by W. P. Bear to the annual conference of the I.E.S. (U.S.A.) this year, entitled "Bridge and Highway Lighting, California," the nine most modern installations of street lighting are described. The total length of street covered by these installations is thirty-two miles, and the cost of erecting 1,880 luminaires 1,000,000 dollars. It is interesting to note that the majority of these modern installations were carried out by means of sodium lamps of the 10,000 lumens type. Spacings varied from 130 ft. to 200 ft.; but the distance most generally adopted was 150 ft. Evidence is quoted to show the favourable influence of good lighting on the rate of traffic accidents—for example, on the Oakland Bay Bridge, San Francisco, where 133 lumens per lineal foot of structure give an illumination of 0.78 foot-candles. The total number of accidents between November, 1936, the date of opening, and June 1, 1938, was eighty-nine, six of which were fatal; thirty-six occurred in daytime, and the remaining fifty-three at night. This total of eighty-nine is equivalent to 1.29 per 1,000,000 vehicle-miles for this bridge.

Australia.

By the courtesy of Mr. W. Riley, who is associated with the Sydney County Council Electricity Undertaking, we have received a series of striking pictures showing the illuminations during Australia's

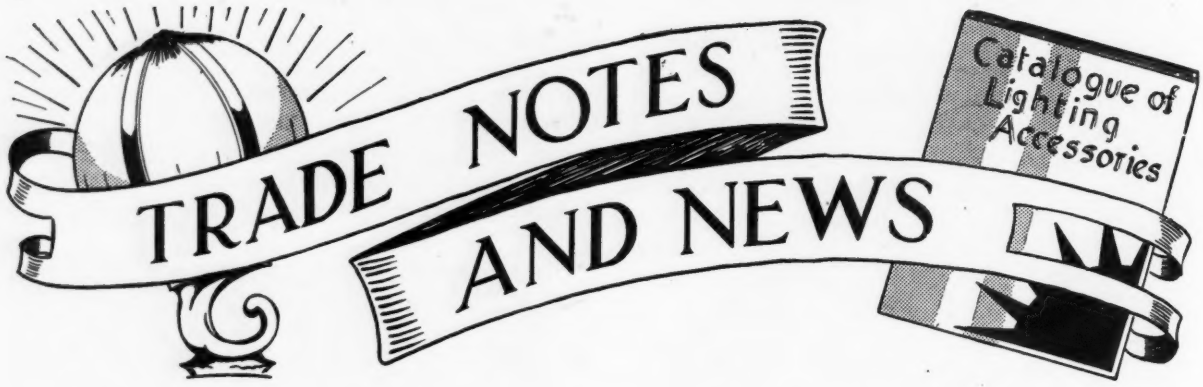
recent 150th anniversary celebrations. The adjacent picture shows a very effective display by means of underwater units. The central figures were flooded with green light and amber light used for the lower figures.

Germany.

In a contribution to the recent World's Power Conference Mr. B. Seeger presented a survey of general street lighting conditions in Germany (reproduced in "Das Licht"). He remarks that at least 46 per cent. of towns and villages with less than 10,000 inhabitants have no street lighting installations at all. In the majority of cases the street lighting authorities use both gas and electricity for their installations. The total number of standards set up in the streets is approximately 1,300,000 (area of Germany = 182,000 square miles), whilst in Great Britain there are approximately 800,000 (area = 93,000 square miles). The average burning hours per annum for street lighting installations in towns with over 10,000 inhabitants is given as not quite 3,000. It is complained that spacing of light points in the smaller towns is increasing to such an extent that in many cases the effect achieved resembles that of a pilot lamp. The average wattage of electric street lamps used in small towns is about 116 and in large towns 173. In regard to gas lighting 18 per cent. of all lanterns erected are equipped with upright burners. The remainder have inverted burners. High pressure gas is only used in 1 per cent. of the total.

Italy.

Recent articles in Italian journals devoted to the glass industry emphasise the important part now being played by glass in building construction. Offices, restaurants, etc., in Genoa in which glass occupies the greater part of the available wall space are depicted. Staircases constructed mainly of unbreakable glass in Switzerland and shops, beauty parlours, etc., in Milan, where original use is made of this material, are also shown.



Searchlights for All Nations

Something out of the common in the way of publicity has been produced by the London Electric Firm, Croydon—an album of coloured photographs showing a selection of military, naval, anti-aircraft, and mercantile marine searchlights supplied all over the world. The countries mentioned literally range from China to Peru. Orders have been placed by many foreign Governments (as well, of course, as the British Government), and by shipbuilders and corporations in many countries. The equipment furnished includes searchlights of the largest size, capable of yielding a beam of 3,300,000,000 c.-p. It may perhaps come as a surprise to some readers who do not think of searchlights as decorative objects that the colours of some of them are quite pleasing, one very effective combination being that of the naval searchlights executed in blue and gold.

A New Holophane Development

We illustrate above an interesting type of Holophane unit of recent introduction, the new Steplite disc unit (No. 9479), which is a central band suspension type pendant suitable for a 150-watt or 250-watt lamp. The fitting is available in colour-sprayed, natural bronze, and chromium finishes.

Arterial Road Lighting near Buenos Aires

A "First Night Gallery" at the recent switching on of Osira street lamps in Avellaneda, Buencs Aires.

The above picture is of interest as a record of progress in arterial road lighting in South America. Eight 400-watt Osira lamps in suitable lanterns were installed by the Anglo-Argentine General Electric Company, Ltd., at the request of the Provincial Government, and were compared against a similar installation of 300-watt filament lamps. Those who witnessed the demonstration were much impressed by the new lighting, and it will be interesting to watch developments.

"Ali-Tal" Benjamin Reflectors

An informative brochure issued by Benjamin Electric, Ltd., analyses the qualities of aluminium-surfaced reflectors. An interesting point is that the proportion of polished and specular reflection is to a great extent under control. Finishes are produced by the British Aluminium Company, ranging from a "super-purity" almost mirror-finish with 84 per cent. reflection factor to diffusing metal reflecting 78 per cent. A diagram illustrates the deterioration, with time, of various surfaces exposed to the atmosphere. "Ali-Tal" reflectors are shown to have the same durability as stainless steel, whilst 20 per cent. more efficient as reflectors.

Famos Lamps

In these days of abundant gas and electricity it should not be forgotten that a wide market still exists for efficient types of oil lamps, particularly in the British Colonies and Dominions. We have before us some leaflets illustrating the famous (may we say "famous"?) Famos lamps, supplied by Falk Stadelmann and Co., Ltd. The standard lamp, burning ordinary paraffin vapour, which serves as the fuel for an upright incandescent mantle, is stated to yield 120 c.-p. and to burn only 1½ pints of paraffin (costing about 2d.) in eight hours' use. The lamps can be obtained in a pendant, table, or floor standard form, and a variety of decorative shades is available.

WHEREVER GAS IS USED FOR LIGHTING

P.A.L
Unbreakable
GAS GLOBES
should be used for
SAFETY

- Cannot break. Save mantles.
- Prevent risk of fire.
- For Institutions and Works.
- Recommended by Fire Assessors the world over.

2/6

Obtainable from all factors or from:—
PIFCO, LTD., WATLING ST., MANCHESTER. London Address: 58 CITY ROAD, E.C.1

A POWERFUL ROBUST SELF-SUSTAINING WINCH
WITHOUT RATCHETS, PAWLS, SPRINGS, WORM OR GEAR WHEELS.
HUNDREDS OF THOUSANDS
IN USE BY

THE LONDON ELECTRIC FIRM,
Brighton Road, SOUTH CROYDON.
TELEPHONE PURLEY 1222/3.

DIRECT DRIVE AND RATIO PATTERNS
Will not run back. No wheels to get caught in. Sizes to 10 cwt. smallest wall space, side or front driving, also special types including multi-division barrels, combined horizontal and vertical operation.

Public Lighting With Gas

The renewal of the agreement of Bromsgrove U.D.C. with the local gas undertaking covers about 500 lamps—an increase of 60 during the past year. Further improvements in the standard of lighting are contemplated.

Improvements in the lighting of Braintree and Bocking involve about 314 gas lamps. Here, too, the agreement with the local gas undertaking has been renewed.

The annual report of the Oldham street lighting department shows a rise of about 5,000,000 cub. ft. in the consumption of gas from street lighting. The total now exceeds 64,000,0000. Improvements, including the adoption of automatic controllers to extinguish lamps at midnight, have saved the Corporation over 21,000,000 cub. ft. of gas.

The St. Helens Corporation has applied to the M.O.H. to borrow £15,000 for improvements in the town's public lighting system.

Paignton U.D.C., where there has been 391 lamps in commission, has entered into a five-year agreement with the local undertaking for improved lighting within its area.

A number of gas-lighted traffic bollards have been installed by the Gas Department at various busy points in Dewsbury. Gas is also being used for street lighting on a new housing estate.

About 455 lamps are affected by a ten-year agreement entered into by the Consett U.D.C. In many cases mounting heights will be increased and the candle-power raised.

Other recent agreements relate to Aberlady, North Berwick (5 years), Borough Green and Marden, Kent (5 years), Coleford, Glos. (10 years), Dalziel and Netherton (6 years), Ecklington and Mosborough, Yorks (2 years), Goring-on-Thames (3 years), Lanark (6 years), Winford (5 years); also North Petherton (Somerset), Raunds and Stanwick (Northants), Millport (Bute), Whetstone, Narborough, and Littlethorpe (Leicestershire), the contracts covering these three parishes being for a period of three years; Newton Stewart (Wigtownshire), Corbridge (Northumberland), Framlingham (Suffolk), and Penistone and Thurlstone (Yorks).

Obituary

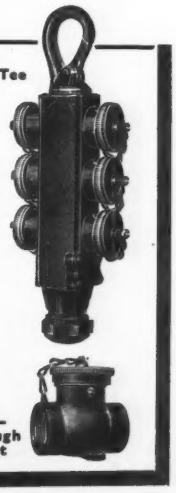
Charles Claude Carpenter

By the death of Dr. Charles Carpenter, in his eighty-first year, on September 7, the gas industry loses another of its great figures. His services to the South Metropolitan Gas Company fall into three main periods. He became chief engineer of the company in 1899. He assumed the chairmanship on the death of Sir George Livesey in 1908, only resigning this position owing to failing health in 1937—nearly thirty years later. As assistant to Sir George Livesey, Dr. Carpenter's name came to be almost equally associated with the principle of co-partnership. It was fortunate for the company that he possessed in a high degree Sir George's gifts as an administrator, but he combined with this quality remarkable skill as an inventor and technician. Apart from his many achievements in connection with gas manufacture he took a keen interest in photometry and gas lighting, being responsible for the famous "Metropolitan No. 2" burner, and later for the single gas-air adjustment, and many improvements in gas lamps right up to the "Supervia" type for street lighting, the introduction of which aroused so much interest only a few years ago.

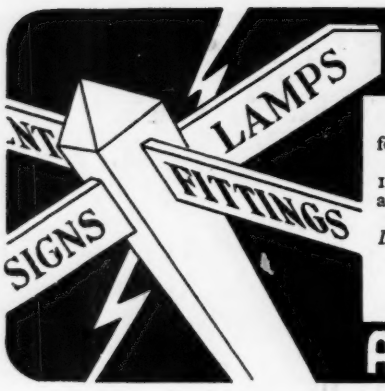
Standard or non-standard in design, but with only one standard of reliability

Send for our 100-page Illustrated Catalogue No. 16D

Wide though it is, the range of standard Niphan cable couplings and plugs does not always include a fitting suitable for a special job. If, on reference to our illustrated catalogue, you do not find what you want, forward your specification to us. We will gladly design specially for you.



NIPHAN
SIMMONDS & STOKES LTD.
Victoria House, Southampton Row, W.C.1. Holborn 8637



WHERE TO BUY

We invite applications for spaces in this new section of the journal. Particulars of terms for each space (approx. 1 inch deep and 3½ inches wide) are given below.

These terms are equivalent to half our ordinary advertising rates, but not less than 12 successive monthly insertions can be accepted on this basis, and amounts are payable in advance.

Payment for an advertisement in this section entitles the advertiser to receive *Light and Lighting* during the period of the contract.

Terms:					
12	Successive Monthly Insertions	£3 10 0	}	Payable
24	,, ,, ,,	£6 0 0	}	in
36	,, ,, ,,	£8 10 0	}	Advance

A DIRECTORY OF LIGHTING EQUIPMENT

1

MODERN LIGHTING FITTINGS
New Catalogue on application
Fittings manufactured to Architects' Specifications
ASCOG LIMITED
Ascog House, 44, Theobalds Road, LONDON, W.C.1

2

PHOTOMETRIC EQUIPMENT for technical, lighting, and scientific research
ALEXANDER WRIGHT & CO., LTD.,
WESTMINSTER, S.W.1

3

ALLOM BROTHERS LTD.
16, GROSVENOR PLACE, LONDON, S.W.1.
Specialists in the Science of Modern Lighting, including:
Theatres and Public Halls. Tennis and Racquet Courts.
Pictures and Picture Galleries. Floodlighting, etc.
Decorative Fittings in Glass and Metal.

4

Take no risks— specify **BENJAMIN PLANNED LIGHTING**
THE BENJAMIN ELECTRIC, Ltd., TARIFF ROAD, N.17

5

MAZDA LAMPS, MERCRA LAMPS
and BTH LIGHTING EQUIPMENT
Our Illuminating Engineers will be pleased to advise on any Street, Industrial or Floodlighting problem
THE BRITISH THOMSON-HOUSTON CO., LTD., Crown House, ALDWYCH, W.C.2.

6

BROMFORD
Seamless Steel Lighting Standards
for all requirements
BROMFORD TUBE CO., LTD., ASTON, BIRMINGHAM

7

THE REINFORCED CONCRETE LAMP COLUMNS SPECIALISTS.
CONCRETE UTILITIES, Ltd., WARE, Herts.
The Firm with Experience.
Creators of the Popular Avenue Design.

8

Curtis Lighting
COMPANY OF GREAT BRITAIN LIMITED
OFFICES: ALDWYCH HOUSE LONDON W.C.2. WORKS: PONDERS END MIDDLESEX.
Manufacturers of **X-Ray Reflectors**

9

DRAKE & GORHAM LTD.
36, GROSVENOR GARDENS, LONDON, S.W.1
and Branches
For all Lighting Problems—Cinemas, Works, Offices, Public Buildings, Country Houses.

10

TYPERLITE LOCAL LIGHTING UNITS ADAPTABLE TO ALL PURPOSES & SITUATIONS
Sole Proprietors and Patentees
ELECTRICITY SERVICES LTD.
ASK FOR CATALOGUE. 86, Cannon St., LONDON, E.C.4
Mansion House 5294 (3 Lines)

11

"ESLA"
BI-MULTI AND MULTIPLANE REFLECTORS
Lanterns, Brackets, Columns, Switches and Fuse Boxes, etc., FOR STREET LIGHTING
The Electric Street Lighting Apparatus Co., The Foundry, Canterbury.

12

VITREOUS ENAMELLING
(CAST and SHEET IRON)
Spun Reflectors, Lamp Casings, Sheet-metal Work, etc.
ELM WORKS LTD. SUMMERSTOWN, LONDON S.W.17. Est. 1903

13

ENGINEERING & LIGHTING EQUIPMENT CO. LTD.
SPHERE WORKS, ST. ALBANS, HERTS.
TELE. 258
DISCHARGE LIGHTING
FITTINGS FOR ALL PURPOSES

14

PHOTOMETERS
PHOTO-ELECTRIC
BENCH, CUBE, STREET and PORTABLE TYPES
FOR CANDLE POWER AND ILLUMINATION TESTS
EVERETT EDGCUMBE Colindale Works LONDON, N.W.9

15

FLOODLIGHTING & FITTINGS, LTD.
294, GRAY'S INN ROAD, W.C.1.
DESIGNERS AND MANUFACTURERS OF MODERN LIGHTING FITTINGS.
CONSULT US ON ANY DECORATIVE, COMMERCIAL OR FLOODLIGHTING SCHEME.
TEL.: TERMINUS 5954.

MODEL 'B'

16

THE GUNFIRE (Trade Mark)
PIONEERS of AUTOMATIC LIGHTING
GAS CONTROLLERS, ELECTRIC, and SYNCHRONOUS TIME SWITCHES
Manufactured by:—
BRITISH, FOREIGN AND COLONIAL AUTOMATIC LIGHT CONTROLLING CO., LTD., BOURNEMOUTH

17

Aldwych House, London, W.C. **G·V·D** *Telephone: Holborn, 7277-8*
FOR BETTER LIGHTING

18

Decorative, Architectural and Commercial Lighting Fittings and Equipment.
Harcourts LIMITED
Stanhope Hse, I Kean St., Aldwych, London, W.C.2.
Telephone: Temple Bar 9671/2/3/4 H.L.50

19

SCIENTIFIC Holophane TRADE MARK ILLUMINATION
The Hall-Mark of Good Lighting

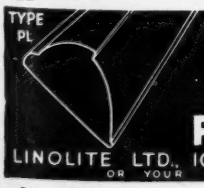
20

NEWBRIDGE
GAS CONTROLLERS FOR STREET LIGHTING AND INDUSTRIAL PURPOSES.
Manufactured by:—
THE HORSTMANN GEAR COMPANY, LIMITED,
NEWBRIDGE WORKS——————BATH
'Phone:—7241/2. 'Grams:—Horstmann, Bath.

21

C. H. KEMPTON & Co. LTD., FOR MODERN STREET LIGHTING BY GAS
235, WESTMINSTER BDGE. RD., S.E.1

22


TYPE PL
LINOLITE *Reflectors for* **PICTURE LIGHTING**
LINOLITE LTD., 100, VICTORIA ST. S.W.1 VICtoria 1563
OR YOUR TRADE SUPPLIER

23

MEK-ELEK Engineering Ltd.,
16, Douglas Street, LONDON, S.W.1
Victoria 5707. Cables: Mekelek, London

24

W. PARKINSON & CO.
FOR
MODERN STREET LIGHTING
BY GAS
IRON LANE, STECHFORD, BIRMINGHAM
Tel. No. STECHFORD 2253 : : and at LONDON and BELFAST

25

F. H. PRIDE LTD.
ILLUMINATING ENGINEERS
CINEMA & HOTEL LIGHTING SPECIALISTS
Designers and Manufacturers of Modern Lighting Fitments and Electrical apparatus
69-81, CLAPHAM HIGH ST., S.W.4 Telephone: MACaulay 2281/4.

26

RADIOVISOR PARENT, LTD.
28, LITTLE RUSSELL STREET, LONDON, W.C.1.
LIGHT ACTUATED APPARATUS
CONTROL OF STREET, FACTORY, AND SIGN LIGHTING.
SMOKE INDICATOR AND RECORDER.

27

ARTIFICIAL DAYLIGHT
THE LAMPLOUGH MATCHING LAMP
FOR ACCURATE COLOUR MATCHING
RESTLIGHT Fittings—for Office, Factory and Home
RESTLIGHT LTD., 16, DOUGHTY STREET, LONDON, W.C.1.

28

SIEMENS
38-39, UPPER THAMES STREET, LONDON, E.C.4
ELECTRIC LAMPS of all types. "SIERAY" ELECTRIC DISCHARGE LAMPS. ELECTRIC LIGHT FITTINGS. FLOOD-LIGHTING APPARATUS. SHOP-WINDOW LIGHTING EQUIPMENT. STORE LIGHTING. INDUSTRIAL LIGHTING, CINEMA LIGHTING, ELECTRIC SIGNS, ETC.

29

REGD TRADE MARK **NIPHAN**
PLUGS, SOCKETS, TEES, COUPLINGS, TERMINAL SOCKETS AND JOINT BOXES *for every portable and temporary lighting requirement.*
SIMMONDS & STOKES, LTD.
VICTORIA HOUSE, SOUTHAMPTON ROW, LONDON, W.C.I
Phones: (Head Office) Holborn 8637; (Works) Putney 1364

30

WASK
PATENT SELF SUSTAINING **WINCHES**
FOR ALL PURPOSES
Quick hoisting with little effort
MADE IN TWO SIZES

Walter Slingsby & Co. Ltd., Keighley
Tel.: Keighley 2367-3749.

31

STRAIGHT-LITE REFLECTORS, LTD.,
73, CANONBURY ROAD, LONDON, N.1.
REFLECTORS FOR CORNICES, SHOWCASES, SHOPWINDOWS & ALL TYPES OF CONCEALED LIGHTING. DIRECTIONAL SIGNS: MODERN FITTINGS AND ARCHITECTURAL LIGHTING UNITS.
Telephone: CANonbury 2066 (two lines).

32

STRAND ELECTRIC
AND ENGINEERING Co.LTD.
SPECIALISTS IN COLOUR LIGHTING and STAGE EQUIPMENT
LIGHTING FOR EVERY OCCASION
THEATRES: EXHIBITIONS
FLOODLIGHTING: CINEMAS
BALLROOMS: PAGEANTS
19-24 FLORAL ST. LONDON, W.C.2

33

For every type of GAS LIGHTING

SUGG WESTMINSTER

When you want the best! CHAPTER ST. S.W.1

34

"THORLUX"
"OVERLAMP" REFLECTORS
DISCHARGE OR GASFILLED LAMPS
SLIP-IT-ON SLIP-IT-OFF OVER THE LAMP FOR CLEANING
F.W. THORPE LTD. 39, BOLTON ROAD, SMALL HEATH, BIRMINGHAM.
FOR EASY MAINTENANCE - THE BEST

35

SPECIALISTS IN THE TREATMENT OF CELLULOSE ACETATE FOR SHADES, FITTINGS, FIXTURES, ETC

20TH CENTURY ELECTRICAL

89-90 NEWMAN STREET, W.1.

36

ULTRALUX AND LOUVERLUX FITTINGS *See them at*

THE LIGHTING CENTRE LTD

TROUGHTON & YOUNG LTD · KNIGHTSBRIDGE · SW1

37

WARDLE ENGINEERING Co., Ltd.

OLD TRAFFORD, MANCHESTER, 16.

STREET LIGHTING EQUIPMENT. FLOODLIGHT PROJECTORS
WORKSLITE REFLECTORS. WARDELYTE GLASSWARE
PRISMALUX DIRECTIONAL UNITS.

We invite Enquiries from Readers or Particulars of "Wants" such as might be satisfied by Advertisers in this Directory

Index to "Where to Buy"

Accessories	29	Lampshades	35
Artificial Daylight	27	Local Lighting	10, 23
Architectural Lighting	1, 9, 17, 18, 22, 32, 36	Photo Electric Cells	26
Automatic Light Control	16, 20, 26	Photometers	2, 13
Cinema Lighting	18, 19, 25, 28, 32	Reflectors	3, 4, 9, 11, 12, 19, 31, 34, 37
Concrete Pillars, etc.	7	Signal Lights	37
Electric Lamps	5, 28	Special Lighting	3, 17, 19, 25, 27, 32, 36, 37
Fittings	1, 3, 4, 8, 12, 13, 15, 17, 18, 19, 22, 24, 25, 27, 28, 32, 33, 34, 35, 36, 37	Steel Standards	6
		Street Lighting Units	5, 11, 12, 13, 19, 21, 24, 28, 33, 37
Floodlighting	3, 5, 15, 19, 28, 32, 37	Theatre Lighting	3, 19, 32
Gaslighting	21, 24, 33	Time Switches	16, 20
Glassware	19	Winches and Suspension Gear	30
Industrial Lighting	4, 12, 13, 19, 27, 28, 37		

N.B.—The numbers are those attached to individual entries in the Directory (See pp. 254-256)

Catalogues and Advertising Literature

BRITISH THOMSON-HOUSTON COMPANY, LTD.—Catalogue of Mazda lamps. Many special varieties are illustrated. There is a colour inset of lamps for decorative lighting, and photographs of typical installations are reproduced.

CURTIS LIGHTING COMPANY OF GREAT BRITAIN, LTD.—Leaflet featuring showcase and shopwindow reflectors; also daylight blue glass reflectors.

EDISON SWAN ELECTRIC COMPANY, LTD.—Several catalogues and booklets illustrating Royal Ediswan lamps.

FALK STADELMANN AND CO., LTD.—Catalogues featuring fittings used for commercial lighting.

PHILIPS LAMPS, LTD.—Lighting fittings catalogue and lists of various special lamps (Philidyne, Philora, etc.).

LONDON ELECTRIC FIRM.—A striking assembly of coloured photographs of searchlights as supplied to all parts of the world.

TROUGHTON AND YOUNG, LTD.—Leaflet dealing with a new series (Ultralux-G) of fittings in flashed opal glass.

N.P.L.: New Director

We learn that, owing to reasons of health, Professor R. H. Fowler has been released from his engagement to assume the directorship of the National Physical Laboratory. Dr. G. G. Darwen, Master of Christ's College, Cambridge, has been appointed to fill the vacancy. Until he can assume his duties Sir Frank Smith will fill the office of director. Correspondence should be addressed, as hitherto, to the Director, National Physical Laboratory, Teddington, Middlesex.

Lighting Contracts Etc.

EDISON SWAN ELECTRIC COMPANY, LTD.—*General Post Office*: For metal filament and carbon filament telephone switchboard lamps; also motor car sidelight lamps. *The Air Ministry*: For aeroplane landing lamps.

GENERAL ELECTRIC COMPANY, LTD.—*The Kursaal, Southend*: for decorative lighting pylons for the illumination of the "Dodgem" track. *North Metropolitan Electric Power Supply Company*: For 250 watt Osira mercury vapour electric discharge lamps in G.E.C. "Horizal" lanterns. *Kuala Lumpur, F.M.S.*: In view of the success of the recent installation of 150 G.E.C. "Fulham" lanterns equipped with 250-watt Osira lamps in Victory-avenue an extension of the system is being suggested.

PHILIPS LAMPS, LTD.—The switching on of a new installation of "Philora" sodium lamps, extending over a mile of the London-Bristol road, in Earley, Berks, took place on October 17.

Lighting of Kardomah Cafés

With reference to the article dealing with the lighting of some of the Kardomah Cafés in our last issue (Sept., 1938, p. 214) we understand that Messrs. Mortimer Gall and Company, Ltd., carried out the installations and co-operated with Industrial Design Partnership in the design of the fittings and general lay-out.